Scientific American.

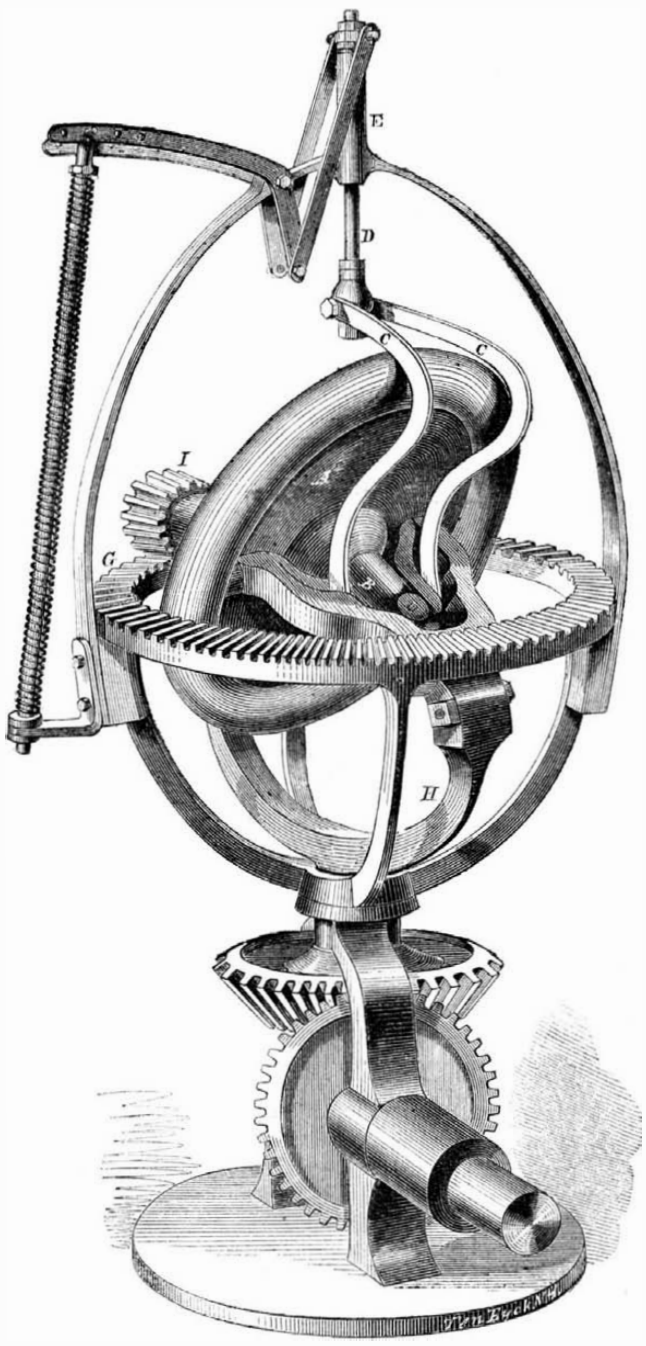
A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES.

VOL. III.—No. 13. NEW YORK, SEPTEMBER 22, 1860. NEW SERIES.

IMPROVED GYRASCOPE STEAM ENGINE GOVERNOR.

The gyrascope applied to the regulating of the speed of steam engines! The invention here illustrated is interesting to philosophers from its peculiar novelty, and it is not less interesting to owners of steamships from its great practical value, which has been demonstrated by trial on three of Cromwell's propellers on the New York and Charleston line, where it was found to add materially to the speed of the vessels, and operated in every respect entirely to the satisfaction of the engineers. In rough weather, when the wheels or propellers of steamships are at one time considerably more submerged than at another, it is frequently necessary to station a hand at the throttle to regulate the speed, in order to prevent the engine from breaking the connections when the resistance is largely diminished, and various plans have been devised to secure the regulation of the speed automatically; the uniform action of the common ball governor being prevented by the motion of the vessel. This great desideratum has been finally accomplished by means of the gyrascope, which has thus been raised from the rank of a toy to an instrument of the highest practical value. As we wish to make our description of this novel invention intelligible to all of our readers, we shall avoid mathematical formulae, and give a common sense explanation of the principle of the gyrascope that all may understand.

If a stone is tied to the end of a string and whirled around rapidly from the end of the finger as a center, and a piece of paper held at an angle is brought against the stone sideways, tending to divert it from the plane of its revolution, the stone will resist this diversion and will pass through the paper in its effort to continue to revolve in the same plane in which it was first started. Let a number of stones be fastened together in the form of a wheel or disk, and caused to revolve around a common center like a wheel on its axle, and each one of the stones will resist any effort to turn it from the plane of its revolution in the same way as the stone first cited. Thus the momentum, or inertia, of matter causes a revolving wheel to resist any effort to deflect it from the plane of its revolution; the resistance being in proportion to the momentum, in other words, in proportion to the weight of the wheel and the velocity of its revolution. This simple property of matter explains all the phenomena of the gyrascope which have so puzzled the heads of men.



ANDERSON'S GYRASCOPE GOVERNOR.

In the accompanying cut, A is a heavy metallic wheel or disk which is caused to rotate rapidly on its axle, B. The axle of wheel, A, is made in two parts, one on each side of the wheel. The pinion, I, is fastened to one end of one of these pieces of the axle, and the opposite end is connected with the center of the wheel by a universal joint in such manner that the rotations of the pinion, I, will cause the wheel to rotate, and will still permit a variation in the angle of its inclination. The other piece, B, of the axle is connected at its middle by a hinged joint with the frame, H, so that the variations in the inclination of the wheel, A, will cause the outer end of the piece, B, of the axle to rise and fall. The frame, H, being connected with the machinery through the intervention of the beveled gear, as shown, is caused to revolve upon its axis, by which means the pinion, I, is carried around upon the geared circle, G, imparting, as it rolls along, a rapid rotary motion to the disk, A, at the same time constantly changing the plane of its revolution. As the momentum of its several parts tends to hold the wheel, in the same plane of revolution, this forcible change in the plane of the revolution causes an effort on the part of the wheel to rise to a vertical position; a vertical plane being less remotely removed from the primary plane of the disk's rotation than the inclined plane into which the wheel would be carried by the onward rolling of the pinion, I. This effort of the wheel to assume a vertical position tends to carry up the outer end of the portion, B, of the axle, and with it the rods, C C and D. As this effort of the wheel is in proportion to the rapidity of its revolutions, if the rod, D, is connected with a throttle valve in the steam pipe, the speed of the engine is necessarily regulated. The use of the spiral spring, J, is to counteract and balance the action of the disk, A.

This important invention, the first perhaps of a long series in which the same principle will be made available, was patented by the inventor, Alban Anderson, of Lancaster, Ohio, and further information in relation to it may be obtained by addressing M. F. Moore or Charles H. Haswell, at No. 6 Bowling-green, this city.

A NEW CALORIC ENGINE.

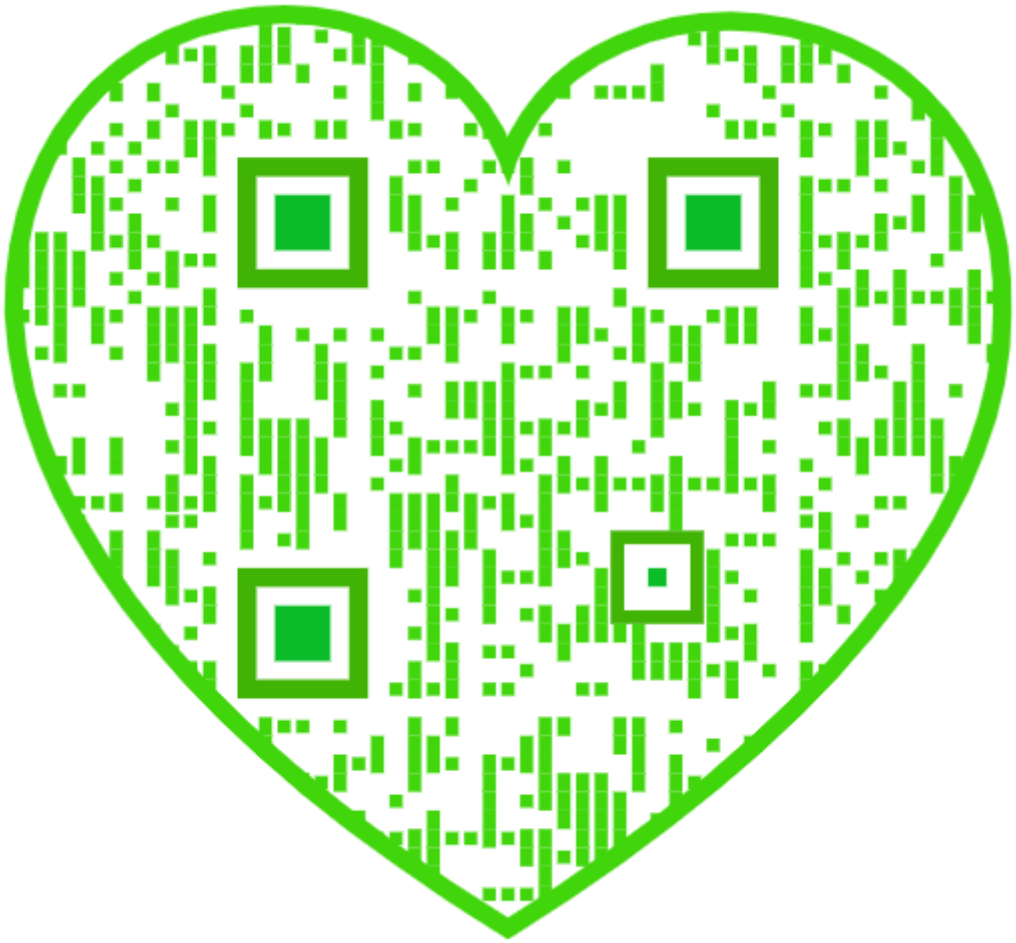
A Parisian, by the name of Lenoir, is creating a great sensation among his countrymen by the exhibition of a caloric engine, which they declare is quite unlike Ericsson's, Franchot's or Sterling's. Lenoir's little shop, in a bye street, is every day besieged by a crowd of curious people from all classes—the Imperial downwards. According to *Cosmos*, and other French papers, the age of steam is ended—Watt and Fulton will soon be forgotten. This is the way they do such things in France.

Lenoir's engine is an explosion engine, in which air, mixed with hydrogen or illuminating gas, is exploded in the cylinder by an electric spark; the piston is thus shot forward and back. The engine is, in operation and construction, like those in which gunpowder or gun-cotton has been used. An engine precisely like Lenoir's, in all respects, except as to what was said about it, was exhibited at the Crystal Palace by Dr. Drake, of this city. The practical objections to such motors are the jerks (see Webster unabridged) of its action and the accummulation of heat.

But a small power to be generated from the burning of gas is a great desideratum. Gas, although much dearer (as fuel) than coal, is so cleanly and manageable, that it will some day come into use for the multitude of small engines which will be found useful for driving sewing and other light machines. Already, in very many private houses, coal has been banished during the summer, and gas isused for all the purposes of cooking. Indeed, for occasional use, gas is cheaper than coal; for there is no waste in lighting up the fire, or after its work is done.

TO MAKE RHUBARB WINE.—We take the following receipt from *The Farmer's Journal* of Lower Canada. Trim off the leaves and grind and press the stalks in any cider mill. To each gallon of juice add one gallon of water and six pounds of refined sugar, and fill the casks, leaving the bungs out. A moderately cool cellar is the best place to keep it. Fill up occasionally, either from juice kept on purpose or with sweetened water, so that the impurities which rise to the surface while fermentation is going on, may be worked off. When sufficiently fermented, which will require from one to two or more months, bung tightly, and let it remain till winter, when it may be racked off into other casks, or bottled. Some persons refine it before bottling, by putting into each barrel two ounces of isinglass, dissolved in a quart of wine.

© 1860 SCIENTIFIC AMERICAN, INC.



A NEW THEORY OF THE FORMATION OF THE SOLAR SYSTEM.

MESSRS. EDITORS:—As the result of some years of study, I propose a new theory of the original formation of the solar system, in opposition to that of Laplace.

My idea is that the sun and planets were primitively a single, vaporous mass, of a lens-shape, rotating in a resisting medium of etherial air, which had the same effect upon the lighter portions of the nebulous planetary matter that our atmospheric air has upon feathery or downy substances that move through it; that is to say, it deflected them toward the center. The consequence is that, of the 739 parts of the solar system, 738 are in the sun, and only one constitutes all the planets and satellites. The matter which was most deflected by revolving in the resisting air was that which was the least dense, and that which moved with the greatest velocity. As the matter nearest the sun moved with the greatest velocity, it was nearly all swept into the sun. At the point where Jupiter was formed, which is about one-sixth of the distance from the sun to Neptune, the velocity was sufficiently moderated to allow cohesion and centrifugal force to prevail over the influence of the resisting medium. This is the reason of the great magnitude of Jupiter and of Saturn, and of the smallness and density of the planets between Jupiter and the sun. The mass of Jupiter is equal to 338 earths; the mass of the next planet (Saturn) is equal to 101 earths, and all the other planets together are not more than equal to 40. The four planets, with the asteroids added, between the sun and Jupiter are, altogether, not equal to 2½ earths; but their density is about five times greater than that of the other planets. It was the great density of the matter of these planets which prevented it from being carried spirally to the sun, as the lighter matter was, with which it was primarily associated during the early stages of planetary creation. Some of the spiral nebulae seen by the telescope are evidently undergoing the same process—the lighter portions, especially near the centers, are gradually moving spirally to the centers to form suns, while the denser is left to form planets. At a definite distance from the center, a giant planet must be formed in each system, analagous to Jupiter.

The tendency of cohesion was to unite the nebulous matter that revolved around the sun into one ring; but the tendency to greater velocity at the inner than at the outer part of the ring antagonized cohesion, and tended to separate the large ring into a number of smaller rings, from each of which a planet was afterward formed. As the cohesive power was the same in all parts of the nebulae, though the velocity regularly decreased from the inner to the outer parts, the consequence was that there was a tendency to make the differences of the velocities of the planets the same, while the intervals or distanees apart—in other words, the width of the rings—increased from within outward.

There appears to have been a tendency of the differences of the velocities to assume an arithmetical ratio, while the differences of distance (the width of the rings) assumed a geometrical ratio, as a necessary consequence. Thus, what is called "Bode's law" is accounted for. The discrepancies and irregularities in the series are to be attributed to the disproportions between the masses of the planets and their intervals, producing perturbations sufficient, in some cases, to prevent the concentration of planetary matter; and thus to give birth to groups of asteroids, some of which will yet be discovered in places where planets would otherwise have been formed. It would seem that the less dense the nebulous matter was when it became separated into rings, the narrower and more numerous the rings were, and the wider the space occupied by the whole system. This is exemplified by the differences between the satellites of Jupiter and Saturn.

The system of Jupiter's and Saturn's satellites are formed on the same plan as the solar system, having one giant satellite, analogous to Jupiter, in each system, larger than all the others, with several small ones between the giant and the primary.

In following out this train of reasoning, I was led to the discovery of an important relation between the velocity of the planets, which is represented in the following tables:—

Relative Velocities of the Planets and the Differences of their Velocities.

	Miles per hour.	Actual vel'cs.
Velocity of Neptune	12,460	12,460
Add 65½x5, equal to	3,275	
Velocity of Uranus	15,735	15,730
Add 65½x10	6,550	
Velocity of Saturn	22,280	22,300
Add 65½x11	7,200	
Velocity of Jupiter	29,480	30,200
Add 65½x20	13,100	
Velocity of the Asteroids	42,580	42,580
Add 65½x20	13,100	
Velocity of Mars	55,680	55,810
Add 65½x20	13,100	
Velocity of the Earth	68,780	68,890
Add 65½x20	13,100	
Velocity of Venus	81,880	81,000
Add 65½x21	13,750	
Velocity of undiscovered planet	95,630	
Add 65½x21	13,750	
Velocity of Mercury	109,380	109.720

It will be noticed that the difference between Uranus and Jupiter is 65½×21=1,375.

Jupiter's Satellites.

Velocity of the fourth	17,743	17,743
Add	7,000	
Velocity of the third	24,743	24,513
Add	7,000	
Velocity of the second	31,743	30,716
Add	7,000	
Velocity of the first	38,743	38,717

The following arrangement is more complicated, but perhaps more accurate:—

Velocity of the fourth	17,743	17,743
Add 618x11, equal to	6,798	
Velocity of the third	24,541	24,513
Add 618x10	6,180	
Velocity of the second	30,721	30,716
Add 618x13	8,034	
Velocity of the first	38,755	38,717

Satellites of Saturn.

Japetus' velocity (eighth)	7,968	7,968
Add 350x4, equal to	1,400	
Undiscovered Satellite	9,368	
Add 350x4	1,400	
Undiscovered Satellite	10,768	
Add 350x4	1,400	
Hyperion (seventh)	12,168	12,215
Add 350x4	1,400	
Titan (sixth)	13,568	13,635
Add 350x10	3,500	
Undiscovered Satellite	17,068	
Add 350x10	3,500	
Rhea (fifth)	20,568	20,763
Add 350x10	3,500	
Dione (fourth)	24,068	24,510
Add 350x10	3,500	
Tethys (third)	27,568	27,760
Add 350x10	3,500	
Enceladus (second)	31,068	31,000
Add 350x10	3,500	
Mimas (first)	34,568	34,986
Add	350	
	34,918	

Satellites of Uranus.

Velocity of the sixth	7,636	7,636
Add	600	
Velocity of the fifth	8,236	8,178
Add	600	
Velocity of the fourth	8,836	8,828
Add	600	
Undiscovered Satellite	9,436	
Add	600	
Velocity of the third	10,036	1,056
Add	600	
Undiscovered Satellite	10,036	
Add	600	
Velocity of the second	11,236	11,209
Add	600	
Undiscovered Satellite	11,836	
Add	600	
Velocity of the first	12,436	12,560

NOTE.—The actual velocities in the right hand column of figures are mostly as estimated by Dr. Lardner. It will be observed that the existence and localities of several undiscovered satellites and of one planet (or group of asteroids) is indicated. The number 65½ in the table of the planets seems to indicate that the nebulae first tended to separate into smaller rings, with a difference of velocity of only 65½; but the irregularities of the masses, together with increased condensation, produced the present arrangement by combining several small rings into one.

J. STANLEY GRIMES.

Lansingburg, N. Y., Sept. 15, 1860.

EXPANSION OF METALS BY HEAT.

Most all bodies expand when heated, but there are scarcely two solid or fluid bodies which expand alike. The metals expand most, and their rate of expansion is best known, because the greatest number of experiments have been conducted with them. Rods of the undermentioned substances, on being heated from the freezing to the boiling point of water, elongate as follows:—

Zinc (cast)	1 on 323	Gold (pure)	1 on 683
" (sheet)	1 on 340	Iron (wire)	1 on 812
Lead	1 on 351	Palladium	1 on 1000
Tin	1 on 516	Glass	1 on 1142
Silver	1 on 524	Platinum	1 on 1157
Copper	1 on 581	Black marble	1 on 2833
Brass	1 on 584		

This is the increase which these bodies sustain in length when heated. A rod of silver 524 inches long will be extended to 525 inches at a temperature of 212°. Zinc is the most expansive of metals; it expands nearly four times more than platinum with the same heat. Glass without lead expands nearly in the same degree as platinum, hence it has been supposed possible to weld these two substances together, but we have not yet seen this done. All expanded bodies return to their original dimensions on cooling. It has been observed that the same solid is more expansible at high than at low temperatures, but the increase is not considerable. All solids have been observed to expand at an accelerated rate when heated up to near their fusing points. Platinum is the most uniform, in its expansion, of all the metals.

The foregoing table will be found very useful to mechanics, as a guide to them not to unite two metals having a great difference in expansibility together in a machine, especially when it has to be exposed to a high heat.

THE BAROMETER A USEFUL INSTRUMENT.

MESSRS. EDITORS:—Knowing that many of your readers, like myself, own a farm, I wish to bring to their notice the barometer, as an instrument of great value at the time of securing their crops.

I purchased one a short time since, and have already proved it to be a certain indicator of changes in the weather. At the time I bought it I was building a house for a farmer who owned a large farm, and hanging it up at his house, we saw the mercury was falling. The next day was a rainy day, as indicated; but before night, the mercury began to rise. The next morning the mercury stood at a high point, but the weather looked so threatening, with a north-east wind, that we all thought it was a "prophet not to be accepted in our country." But by noon the aspect had entirely changed, and the barometer had told ns the truth. In two or three days after that, the mercury commenced to go down again and continued to do so all day. It was a lovely afternoon, with a north-west wind blowing gently, and certainly did not look like a storm. Mr. J., however secured his grain, as the barometer had told us the truth before, and though it was perfectly clear at bedtime, it rained before daylight next morning.

R. C. N.

Guilford, N. Y., Sept. 10, 1860.

THE PHENOMENON OF REGELATION.—From a long paper on this subject by Professor Faraday, which we find in the London *Mechanics' Magazine*, we take the following extract. It contains the pith of the whole matter:—"The philosophy of the phenomenon now understood by the word 'regelation' is exceedingly interesting, not only because of its relation to glacial action under natural circumstances, as shown by Tyndall and others, but also, as I think, especially in its bearings upon molecular action; and this is shown, not merely by the desire of different philosophers to assign the true physical principle of action, but also by the great differences between the views which they have taken. Two pieces of thawing ice, if put together, adhere and become one; at a place where liquefaction was proceeding congelation suddenly occurs. The effect will take place in air, or in water, or in vacuo. It will occur at every point where the two pieces of ice touch; but not with ice below the freezing point, *i. e.*, with dry ice, or ice so old as to be everywhere in the solid state."

STEAM TUNNAGE OF THE SEVERAL PRINCIPAL PORTS OF THE UNITED STATES.—The following statement of the enrolment of steam vessels belonging to the several ports of the United States, in 1859, is taken from the "Report on Commerce and Navigation," recently issued by our government:—

Ports.	Tuns.	Ports.	Tuns.
New York	120,598.09	Mobile	28,898.52
New Orleans	75,789.91	Philadelphia	22,288.50
St. Louis	54,515.64	Cleveland	21,720.73
Pittsburg	40,550.08	Baltimore	19,260.83
Buffalo	42,464.04	San Francisco	10,214.94
Detroit	33,005.12	Boston	9,998.52
Louisville	29,626.73	Chicago	7,651.45
Cincinnati	25,668.31		

The total steam tunnage of the whole United States, for the year ending 30th of June, 1859, was 676,004, 83-95 tuns.

THE SEPARATION OF THE RAYS OF HEAT FROM THOSE OF LIGHT IN THE EYE.—Our readers are aware that the sunbeam consists of three elemennts—light, heat and the chemical rays. A paper has recently been communicated to the French *Academie des Sciences* by M. J. Janssen, giving an account of a series of experiments undertaken by him, to ascertain how large a portion of the *heat* rays pass through the central portions of the eye and reach the retina at the back. His experiments show that *all* the rays of heat are absorbed before they reach the retina—two-thirds by the cornea and the other third by the aqueous humor.

© 1860 SCIENTIFIC AMERICAN, INC.

SURPRISING FACTS IN REGARD TO THE VALUE OF SEWING MACHINES.

In the recent contest before the Commissioner of Patents for the extension of Howe's patent for sewing machines, the following facts were proved in relation to the value of the patent, which, at first thought, are certainly astonishing.

They are selected from a large number of facts of a similar character which were arranged and presented by George Gifford, Esq., of this city, senior counsel for the applicant, in an argument of great ability, and which we are not surprised to find produced a convincing effect on the mind of the Commissioner.

Ezra Baker states that the amount of the boot and shoe business of Massachusetts is $55,000,000 annually, and the ladies' and misses' gaiter boot and shoe business is at least one-half of the whole boot and shoe business in that State; and is, therefore, equal to $27,500,000. He also states that about 1-11th of these $55,000,000 is paid for sewing labor. From this proportion, it appears that the annual sewing labor upon ladies' and misses' gaiter boots and shoes is $2,500,000, and that it would cost four times as much if done by hand—so that the *annual* saving by this invention in the manufacture of ladies' and misses' boots and shoes, in one State, is $7,590,000. The price of these shoes has been reduced to the consumer *one-half* by the introduction of sewing machines; the price of material remaining the same.

Oliver F. Winchester is a manufacturer of shirts at New Haven, Conn. He says that his factory turns out about 800 dozen per week; that he uses 400 sewing machines, and that a machine, with an attendant, will do the work of five hand-sewers, at least—and do it better. He pays, at least, $4 per week; but, reckoning it at $3 (the old price for sewing before machines were introduced), it shows a saving in this single manufactory of $240,000 a year. Allowing the males of the United States to wear out two shirts a year apiece, and a proportional saving would amount to $11,680,000 annually in making the single article of shirts.

James W. Millar, connected with Brooks Brothers, manufacturers of clothing, states that that house alone do a business of over $1,000,000 annually, and use 20 sewing machines in the store and patronize those that others use, and do about three-fourths of all their sewing by machines, and pay annually for sewing labor about $200,000; $75,000 of this is saved by machines—that is, the machines save $75,000 on every $200,000 paid for sewing labor. And he states that the house of Brooks Brothers does not make 1-100th part of the machine-made clothing manufactured in New York. This, putting the proportion at one 1-100th part, would make the business of manufacturing machine clothing in the city of New York $100,000,000 annually; and, at the rate that house pays for sewing, it brings the cost of sewing in this branch of manufacture in the city of New York (even with the assistance of the sewing machines) up to *twenty millions of dollars*. A saving of $75,000 on every $200,000 of this makes $7,500,000. James McCall states an estimate of what proportion of the clothing business of the United States is done in the city of New York, and puts it at about 1-10th. Multiplying the cost of sewing in that business alone in New York, as shown above, by 10, carries the extent of cost in the United States to $200,000,000 per annum; and assuming that as large a portion of this is done by machines in other places as is done in the city of New York, it makes the cost of sewing labor in this particular manufacture in the United States the above sum of $200,000,000; and this, too, by the assistance of machine sewing. $75,000 on every $200,000 of this is saving, which makes the saving in the United States amount to $75,000,000 annually in this branch alone.

Food and clothing are the first two necessaries of life. India-rubber, electric telegraphs and steamships are used only by a portion of the community, and by those but a small part of the time; but every person, from the beginning of life to its end, must be supplied with something to eat and something to wear. Those inventions, therefore, which greatly facilitate the production of food and clothing form a class by themselves, entirely different from and above all others. The invention of the spinning jenny, which aids so much the making of cloth, was, doubtless, of greater importance than that of the sewing machine; and this is also true of the plow, which multiplies so many fold the production of food; but, with the exception of these two, the sewing machine is the most important invention that has ever been made since the world began.

The claim of novelty was very thoroughly examined, and it is interesting to see how near Walter Hunt came to securing this splendid prize 10 years in advance of Howe. But Hunt was lacking in *perseverance*.

Judge Sprague, of the United States Circuit Court for the District of Massachusetts, in 1854, after repeated investigations in suits both in equity and at law, had the whole subject before him, and decided every relation which the alleged experiments of Hunt could have to Howe's patent; and in his opinion delivered on that occasion, among other things, he says:—"Now, to whom is the public indebted for the present useful improvement or useful existence of the sewing machine? Upon that, there is no question. There is no evidence in this case that leaves a shadow of doubt that, for all the benefit conferred upon the public by the introduction of a sewing machine, the public are indebted to Mr. Howe." * * "If Mr. Hunt did not go to the extent of having perfected a machine, although he made many ingenious devices, it was, in the eye of the patent law, a nullity; it gave nothing to the public." * * "The whole testimony leaves upon my mind no doubt that, however far Mr. Hunt had advanced with his machine, it was never perfected in the sense of the patent law; that it was only an experiment and ended in experiment, and was laid aside as an unsuccessful experiment until the introduction of Mr. Howe's machine."

We have also, in reference to this question of novelty, carefully examined the report of the acting Examiner—Mr. J. Van Santvoord—to whom this case was referred, and we find that he completely establishes the novelty of the claims issued to Mr. Howe in his patent of Sept. 10, 1845. In reference to the claims of Walter Hunt, and the English patent of Fisher & Gibbons, which have been arrayed against the originality of Mr. Howe's invention, the Examiner shows that Hunt's invention of 1834 did not exhibit the same combination as is embraced in the Howe patent; and, in reference to the supposed interference with the English patent, it appears that Howe had perfected his invention in May, 1845, which was one month previous to the enrollment of the Fisher & Gibbons specification, which, according to the rules of the Office, establishes the priority of Howe's over the English patent. The Examiner, however, goes on to say, that "if the date of the enrollment is not the true date of the publication, the result is not changed, for the reason that this invention does not show the element of Howe's combination, further than the needle and shuttle."

George P. Clapp says that he was in the clothing business in 1845, and saw Howe's original machine operate, and was present when he tried its speed against the hand-work of five girls, and beat them; its work was neater and stronger than hand-work. He saw the same machine operate again in July last, at the rate of 280 stitches per minute, and do good sewing.

George R. Townley says that he is a "manufacturer of fine custom-made boots;" that he uses an original Elias Howe sewing machine; that he has had this machine in use about eight years; that it was made by Mr. Bliss, under the superintendence of Elias Howe, Jr.; that, up to a year ago, he had not "paid out one penny" for repairs on it, and then paid only $1, and nothing more up to the present time, and that it is just as good and as perfect now as it was when he bought it, and does as good work as ever, and has been in daily use; that his class of work is of the finest quality; that the machine is preferable in that work to any with modern improvements; that the machine is a great saving to his business, and will do as much work in five minutes as a hand-sewer will do in an hour, and the work is stronger.

GUTTA-PERCHA, substance very closely resembling it, has been found in Berbice, British Guiana. It can be vulcanized and molded, and, in short, possesses all the qualities of gutta-percha. The discovery is due to Dr. Van Holst, of Berbice.

COMPENSATING PENDULUMS

MESSRS. EDITORS:—On pages 36 and 99 of the present volume of the SCIENTIFIC AMERICAN are remarks relative to compensating pendulums. During the last year I have made some experiments in relations to combinations of wood and metals, and of different metals with each other, for the purpose of constructing an apparatus for measuring variations of temperature in a manner to make such measurements susceptible of being recorded by clockwork on a fillet of paper. Those experiments in which wood was employed as a part of the apparatus were full of the most extravagant discrepancies, which were eradicated only after metal was substituted for wood. My experiments enabled me to verify the remarks on page 99. In the construction of a compensating pendulum, the following particulars are to be observed to secure the nearest approach to uniform measurements of time by the pendulum:—The rates of expansion (by variation of temperature) of the particular samples of metals employed in the construction of the pendulum should be first obtained, and the different parts of the compensating system should be so proportioned from these rates as to preserve the distance from the point of support of the pendulum to the center of gravity of the weight at its lower end equal under all temperatures. Accuracy requires that much care be taken in ascertaining the rates, as different samples of iron and brass (the materials usually employed) have different rates of expansion, inasmuch as different methods employed in preparing iron and brass vary the proportions of the alloys which compose them (alloys of various kinds having different rates of expansion). Iron, it is well known, may, when reduced directly from the ore, be alloyed to a considerable extent with various substances, in varying proportions, so that scarcely two samples will be found to agree in their rates of expansion. Of brass the same is equally true, from the fact that atomic precision is not attempted in its fabrication, except in a few rare instances. A pendulum properly compensated may fail to give equal measures of time, being constantly disturbed by various external causes, among which are the varying resistance of the atmosphere, the disturbing influences of those causes which produce tides, and particularly those secondary causes which influence the hight of tides; and the disturbances arising from change of position of the earth relative to its axis and its orbit. It is extremely probable that a pendulum cannot be made to make invariably equal measurements of time, in consequence of those disturbances which are constantly varying the force of gravity on the earth's surface acting upon it. An excellent method of compensating a pendulum for variations of temperature would be to have a system of compensating rods fastened to the bracket which supports the pendulum, so as to act upon a convenient device for elevating or depressing the pendulum. This would also make it easy to adjust the pendulum without stopping it for that purpose, while the additional resistance of the atmosphere on the rods, as a part of the pendulum. is obviated.

J. L.

Mohawk, N. J., Sept. 11, 1860.

[The above interesting hints are all based on correct knowledge and sound philosophy.—EDS.

A HIT AT AVOIRDUPOIS.

MESSRS. EDITORS:—After such an exposure of our absurd systems of weights and measures, as lately appeared in the columns of the SCIENTIFIC AMERICAN, we will be alike wanting in reason and religion to maintain them. Avoirdupois weight was originally enacted by Henry VIII. (the most ignoble of butcher kings) for the benefit of butchers who gormandized him with mutton chops and roast beef, and is still maintained for the purposes of oppression. A paragraph appeared lately saying a reform of weights and measures was passing through the British Parliament. It at least had gone to a second reading in the House of Lords. Can you inform your numerous readers concerning its nature, and if it became law? J. E.

Verona, Wis., Sept. 1, 1860.

[We have never heard of this law coming into operation as yet.—EDS.

THE geological examination of Texas has revealed the existence, in great abundance in that State, of the finest clay, suitable for the manufacture of Queen's ware.

© 1860 SCIENTIFIC AMERICAN, INC.

IRON WORKS—THEIR LOCATION, ARRANGEMENT AND CONSTRUCTION.

An Inaugural Essay; by CHARLES G. WILCOX, *Mechanical Engineer, No.* 135 *North Third-street, Philadelphia, a candidate for the degree of Bachelor of Mechanical Engineering in the Polytechnic College of the State of Pennsylvania. Presented June* 28, 1860.

[Published by permission of the Faculty.]

We will now proceed to a description of the plans.

The location is upon a street 60′ to 80′ wide. The lot has a frontage of 250′ and a depth of 300′.

The machine shops, being the most showy buildings and requiring most light, have been placed upon the main street and furnished with a handsome wall but little more expensive than an ordinary plain one.

The office has been placed so that it is conspicuous from the street, and is convenient to those buildings which require to be visited most frequently.

The foundry is roomy and of good shape. It is light, has abundant yard room, and direct communication with the heavy fitting shop, machine shop and street.

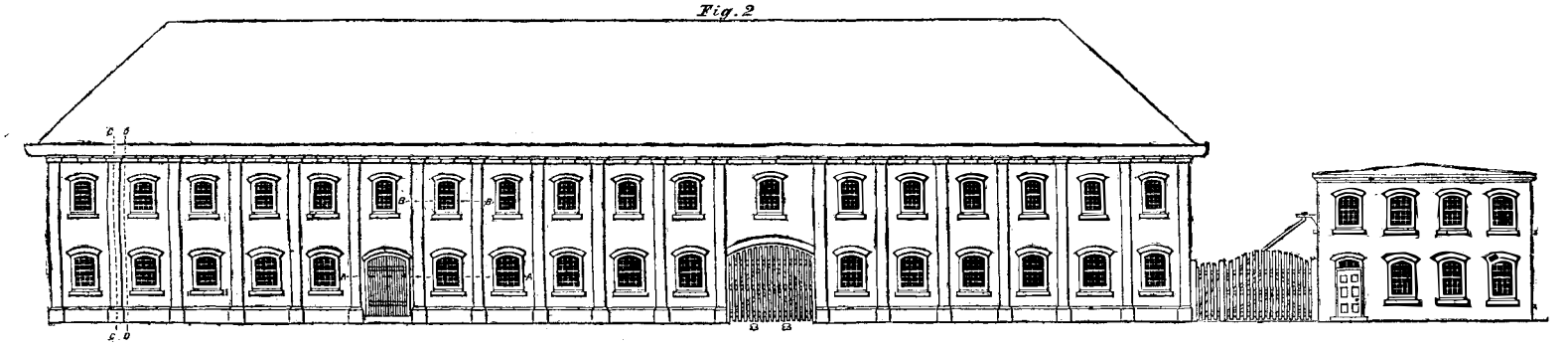
The smith and boiler shops occupy the positions we have shown to be desirable.

The pattern shop and store room are convenient to both foundry and office.

The foundry building is 75′ 6″ by 95′ 6″, with 27″ brick wall throughout. This is the heaviest wall in the plan, and is demanded by the three heavy cranes. The building is lighted by 15 windows 5′ by 7′, and 20 windows 4′ by 6′. The walls are 30′ high. The roof is gable, and is supported upon 8 trusses. Three of these are made with heavy tie-beams to receive the top of the cranes. Ventilation is obtained by blinds which may be opened and closed, as shown in the drawing of the roof. The large crane commands a floor area of 57′ diameter, and by its assistance heavy ladles can be passed from the cupolas to either of the other cranes, and thence to any part of the floor. It can also be used in loading upon the cars from its end of the building. Two cranes, commanding circles of 40′ diameter, are placed at the other end of the foundry, and can be used independently or in connection. One of them can be used also in loading. A considerable space upon the floor is commanded by the three cranes, and here the large castings should be made. The track, passing entirely across the foundry, enters at a 14′ doorway, through which the largest castings can be taken to the yard or to either of the fitting shops. The cupolas stand outside the walls and midway of one end of the building. All operations connected with them are performed in the building appropriated to their use. They are charged from a platform 7′ by 18′, to which coal and iron are elevated upon a platform 9′ square, which is raised and lowered by steam, the power being obtained from the engine near at hand. Under this platform is space for cleaning the cupolas, keeping tools, ladles, &c. Back of the platform are storehouses where iron and coal can be kept under cover. That portion for the former is 11′ 6″ by 18′, and that for the latter, 19′ 3″ by 18′. The entrances to these storehouses are large enough to permit carts to drive in and discharge their loads.

In one corner of the coal room is placed the fan which furnishes blast for the cupolas. The fan is set below the level of the ground, and the blast is carried in a pipe under ground to the cupolas. The fan is driven by a belt from the 12′ fly-wheel of the engine adjoining. In this position the hum of the fan would not be annoying. Adjoining the cupola building is the core room and ovens.

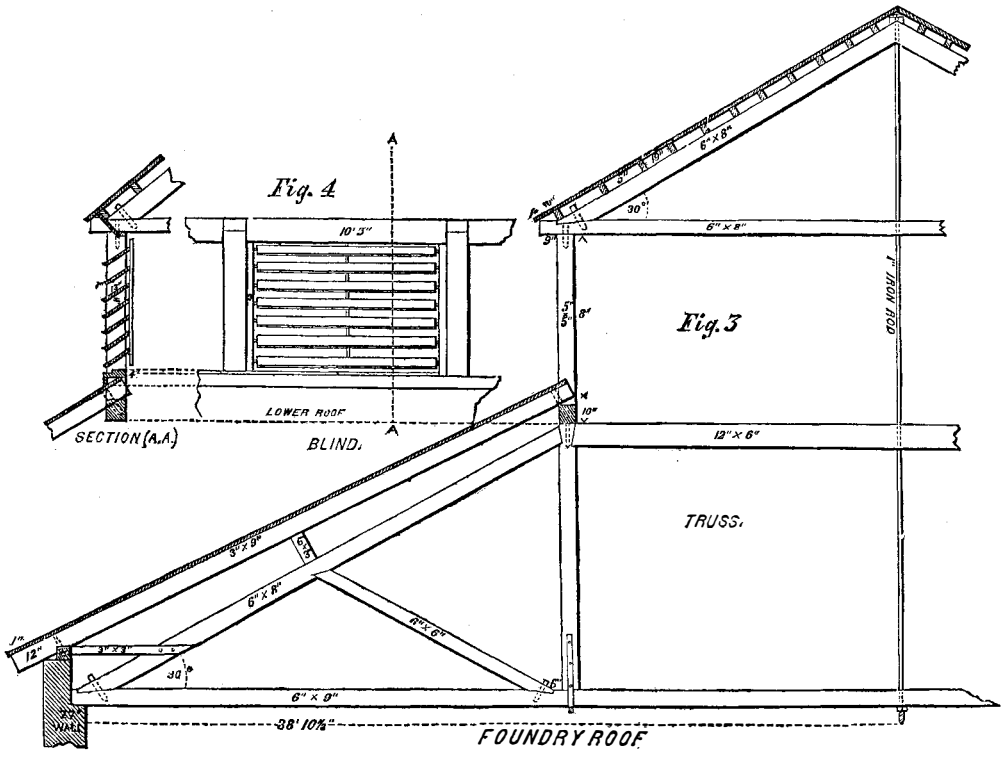
Fig. 2



ELEVATION OF MACHINE SHOP FROM STREET.

The former is 22′ 6″ by 51′, one story high, lighted by 8 windows 4′ by 6′, and communicating directly with the foundry by a 5′ door. The principal core oven opens directly into the foundry, and is traversed by a track. The small oven is at the rear of the large one, and is reached from the core room. Both ovens may be heated by the same fire.

Passing from the foundry, we follow the track across the yard 150′ to the machine shops. Here the track passes under the second story of one of the shops and through into the street. On the left we have the heavy fitting shop, 59′ 7½″ by 76′ 7½″. This is open to the hight of the two stories of the adjoining machine shop, giving an elevation from ground to tie-beam of trusses of 29′ 6″. The roof of this and the connecting two-story shop is supported by 14 trusses, shown in detail in one of the drawings. The large crane in the center commands a circle of 51′ 6″ diameter, and the large tools are so placed as to be within its reach. Its top is received by the first truss. This crane may be used also in loading wagons which drive directly into the shop through the 14′ doorway. The crane having a 23′ arm is supported by a truss above and sweeps through a 22′ opening in the wall, so as to be used in loading and unloading from the car standing upon the track below. Castings from the foundry can be thus taken from the is 76′ 6″ by 112′. The ceiling of the lower story is 14′ high, and that of the upper one 11′ 6″. The floor of the second story is supported by the walls, and by a girder which is hung from the king posts of the trusses above by 1½″ iron rods. The rods are omitted upon two trusses, because the posts of the cranes below act in their place. This method of supporting the floor permits the use of cranes in the lower room, where they are very necessary. The iron rods in the upper room are not objectionable. Along the front of the lower room a vice bench is placed, and the windows over this are 10′ 3″ apart. This allows for a vice to be placed before each window. This room is lighted by 22 windows 5′ by 7′, and has a 7′ 6″ door opening upon the street for loading and unloading one of the same size, through which work can be taken from the cars directly into the shop, and a 5′ door opening into the yard. Communication with the smith shop is by a 4′ doorway.



The second story is reached by two stairways at extreme ends of the room. One of these affords to those up stairs best access to the smith shop, and the other to the office.

The smith shop is 37′ by 97′ 6″. It is where it should be, close to the machine shops. It contains 8 forges set 15′ apart, and built obliquely so that long work can be heated in any, without interfering with the others. The walls are 17′ high, and the building is lighted by 14 windows 5′ by 7′. A steam hammer, with its heating furnace, occupies the extreme end of the building. There are two 8′ doors opening into the yard, and one 4′ door at the end used to bring in coal, which may be stored between the smith and boiler shops. The roof is gable, and may be supported (as shown in the drawing of the roof) upon eight trusses constructed with ventilating blinds.

The boiler shop is placed where the riveting will not be an annoyance in the machine shops or at the office. It is 68′ 6″ by 77′ and communicates with the yard by a doorway 30′ wide, which is closed by a sliding door suspended upon rollers. The walls are light and of the same hight as the foundry walls. The ordinary truss is used for the roof, ventilation being supplied by the windows.

© 1860 SCIENTIFIC AMERICAN, INC.

The building is lighted by 13 windows 5′ by 7′, and the same number 4′ by 6′.

The pattern shop and store room building is 37′ by 115′, two stories in hight. The lower story is 14′ high from floor to ceiling, and is divided, by a partition, into a pattern shop 53′ by 62′ 9″, and a show and packing room 37′ by 53′. Each of these divisions communicates with the yard by a 7′ 6″ doorway, and with the upper story by a 5′ stairway. The upper part of the building is used for a store room for patterns. It is 11′ 6″ high. The whole building is lighted by 58 windows 4′ by 6′. The roof is gable, and is supported by 10 trusses of the ordinary construction.

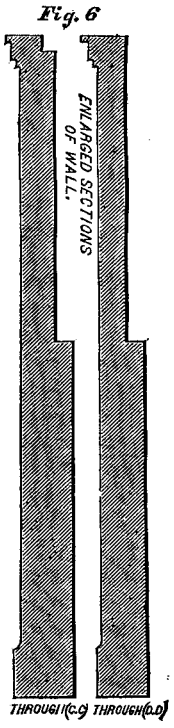
The office building is two stories in hight, and 35′ square outside. It is so placed as to be upon the street, and yet near the machine shops, with which the principal communication is held. The store room for finished work is also convenient. The lower floor contains a general office 16′ 6″ by 32′, through which every one entering the works must pass, and from which all that passes out and in the gateway can be seen. Thus nothing can be taken from the enclosure, or from any of the shops, without being observed from the office. The street exits from the machine shops, as well as the 23′ gateway, are intended to remain closed.

On the lower floor is also the private office, 15′ by 25′ 6″. The second floor is in one room for drafting. It is well lighted by 16 windows 4′ by 6′, and makes an admirable room for the purpose.

With regard to power for driving machinery, a 75-horse horizontal engine is placed in the lower floor of the principal machine shop, having a space of 20′ by 30′ enclosed about it for an engine room.

Power is conveyed from this directly to a main line of shafting which extends through both shops, and is transmitted to a line on the opposite side of the principal machine shop. These lines are clear of the cranes, and may work on to counter shafts for the tools, which should form two rows about 25′ from the front and rear walls.

Fig. 6



This arrangement brings the cranes over the tools, and yet avoids interference with the belts.

Arrangement of minor shafting in the heavy fitting shop is easy.

Power is taken to the smith and boiler shops by a line of shafting running along the wall of the former. Bevel gears are avoided by the use of a perpendicular shaft, with two 3′ pulleys and two quarter turn belts. The same shaft and pulleys may be used with a single belt if preferred. The fan and trip hammers in the smith shop can be driven from this line, and the tools in the boiler shop are properly placed under the shaft, as shown in the plan.

The boilers for this engine are placed 6′ from the shop, and have a fire room which communicates with the engine room and with the yard. Coal is stored under cover in such position that it can be unloaded directly from the cars, and passed into the fire room in small quantities by a shute.

For the work of the pattern shop, and for driving the fan and elevator at the foundry, a 15-horse engine is placed in a separate engine house, 12′ by 24′. The engine is below the level of the ground, and the fan belt passes under the surface also. The boiler lies alongside the wall. A line of shafting passes along the lower story of the pattern shop for driving planing machines, saws, lathes, &c.

The boiler of this engine will furnish sufficient steam for heating the pattern shop and foundry. The machine shops and office may be heated by steam pipes from the principal boilers.

The steam for the steam hammer may be carried from the boilers of the large engine, or made in a boiler over the heating furnace.

The yard room of these works is abundant, and accessible from all the shops. The communication between the shops is easy, and the office is so located as to command the whole.

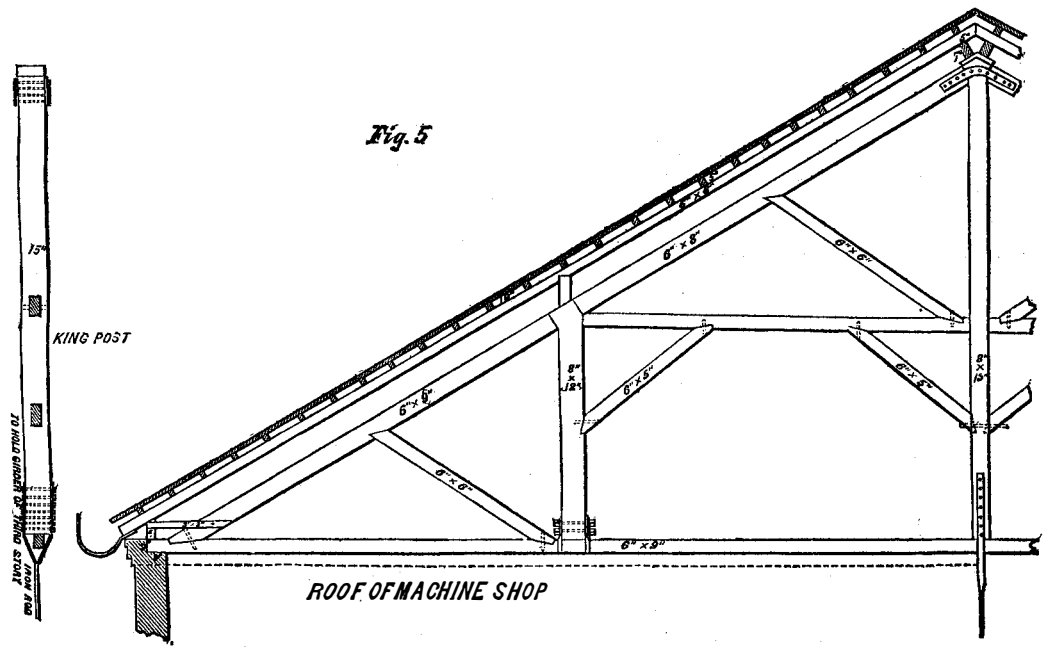
The buildings are substantial, but not expensive. Roofs should be covered with tin or slate.

Foundations depend upon the character of the ground.

The windows have been made with small size glass, as breakage is of necessity frequent.

Another article might be written upon the equipment of these works with suitable machinery. This is a matter of great importance, and should be placed in the hands of a person of experience and good judgment. We may treat this branch of the subject at some future day.

Fig. 5



N. B.—Mr. Wilcox can be found at his office, No. 135 North Third-street, Philadelphia, and is prepared to furnish plans and suggestions to those contemplating erection of shops, &c.

AMERICAN AND ENGLISH OAK.

The people of England have long entertained the notion that the oak grown there is superior to that grown in America for shipbuilding; hence they have not rated American built ships so highly as those constructed of British oak. Donald McKay, of Boston, who is now in the land of Queen Victoria, is endeavoring to enlighten our British cousins on this subject, and to show them how blindfolded they have been to their own interests by the prejudices which they have entertained in favor of their own timber. He states, in a recent letter to the Boston *Commercial Bulletin*, that he "had often heard complaints about the durability of our timber and the rotten state in which our ships are usually found, while a similar complaint is hardly ever made of English ships in America," He gives a very reasonable explanation of this by stating that, as much of the English trade is carried on in American bottoms, especially passenger ships, these have to be surveyed every year—mostly in Liverpool—and thus their defects are discovered and registered; while the absence of a similar law in America, and the little trade carried on with us in English ships, prevents all opportunity of examining their condition in our ports. He says:—"Miserable timber is used in many of the English private yards, and the best proof for this assertion is that most of the gunboats built by the principal firms in England not longer than four or five years ago—and all of the choicest English oak—have been found, on survey this summer, to be in a most frightful state of rottenness. The excuse made for this is that these vessels had been built of unseasoned timber. Now, all our merchant ships and steamers are built of unseasoned, and even quite green timber; but there is, to my recollection, no instance of such wholesale rottenness in our merchant ships on record. There is no doubt that good English oak is a most excellent material for shipbuilding; but from what I have seen, heard and read about it, I have no hesitation in stating that its qualities have been exaggerated to the damage of other (in no ways inferior) timber. Prejudice is a difficult thing to overcome in this country; but the durability of our well-built clipper and packet ships running for years and years under the most trying circumstances, without evincing any sign of weakness or rot, is a fact that even the most prejudiced Englishman cannot erase from the book of experienee. The great difficulty in the regulation of our ships arises from the fact that they are thrown into the same category with the Canada ships; as the latter are known to rot very fast, it cannot be understood here why it should be otherwise with our ships, which are also built in North America. We might as well say that English ships cannot be durable because Russian ships are known to rot very fast, and England and Russia belong to Europe. I yet once more express my opinion that our white oak timber growing southward of New Hampshire takes rank among the very choicest and fittest timber for ships building, and that no other material is known to be superior to it."

MELTING ZINC BY GAS.

We translate the following article from the *Journal de L'Eclairage au Gaz*, published at Paris:—

"The melting of zinc, which is generally performed in plumbago crucibles over a coke fire, requires an elevated temperature that is difficult to regulate. If the temperature becomes too high, it causes a loss of zinc by evaporation and burning, and it also seriously injures the quality of that which remains; the oxyd of zinc resulting from combustion mixing mechanically among the metallic mass and producing what is called burnt zinc. This accident occurring daily in zinc foundries, aroused the attention of Mr. Miroy to the advantages of employing gas in this operation. His apparatus consists of a cast iron crucible placed upon an upright cylinder in a conical furnace, where the gas is burned. This furnace is formed of two concentric envelopes of iron plates, separated by a layer of sand; or it may be made of fire brick. The gas is brought in obliquely from the two sides by two pipes, each concentric to a larger pipe, leading compressed air; the gas pipes being 6-10ths of an inch in diameter, and the air pipes 2 8-10 inches. Mr. Miroy estimates that the volume of air employed should be triple that of the gas, and this proportion is regulated by stopcocks in the pipes. The air is forced into the pipes by a blower driven by power. The melting by gas is more rapid and less costly than the fusion by coke, especially when a crucible has to be mounted for a single melting. There is also a great saving in the cost of crucibles.

APPLICATION FOR THE EXTENSION OF A PATENT.

Harvesters.—Andrew J. Cook, of Enon, Ohio, has applied for the extension of a patent granted to him on the 20th of November, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 22d of October next; and the petition will be heard at the Patent Office on the 5th of November, 1860.

© 1860 SCIENTIFIC AMERICAN, INC.

OUR SPECIAL CORRESPONDENCE.

A Visit to Portland, Maine—Propellers Preferred to Side-wheel Steamers—Sunrise at Sea—Portland a Growing and Thriving Business Place.

PORTLAND, Maine, Aug. 26, 1860.

MESSRS. EDITORS:—At four o'clock on Saturday, the 25th ult. we stepped on board of the propeller *Patapsco*, then laying at her wharf in New York, and advertised to sail at that hour for Portland. Our voyage was unusually prosperous, the sky remained clear during the whole time, and while the sun was not too hot by day, the moon-beams sparkled upon the water by night, which together made the hours pass softly and pleasantly away. Monday morning we were all up by four o'clock to see the coast of Maine, and the harbor of Portland. As we came on deck the sun was just rising, as it were, from the ocean itself, and the golden glow cast upon changing waters made us realize, what we have often before read about, but never before appreciated, the beauty and magnificence of a sunrise at sea. As we neared the coast we espied upon our left the shore of Maine, and upon our right, one of the many islands that abound upon this coast. Many years ago, it is probable that all this coast was submerged, and formed a part of the ocean bed; but the gradual accretion of time, the washing of soil from above have made the coast, and now we find it abounding in capes, promontories and islands. It is said that there are three hundred and sixty-five islands in Portland harbor, or one for each day in the year.

The presence of these islands make it one of the most magnificent ports of which the world can boast. As we turned the point which hid the city from our view, the enterprising little propeller announced our arrival by the firing of a gun from our bow, which made us feel very much like foreigners. On the whole we like propeller traveling very well, the motion is more aggreeable we think than the motion of side wheel steamers; and although they may lack speed, still we know our little vessel more than paid expenses, which is an item worthy of consideration.

Portland itself is growing, its business is thriving; and if its inhabitants cannot grow rich here quite so fast, still they have the advantages of living in a place where land is comparatively cheap, and the consequence is, that all who are making any money at all, live in comfortable and in many instances elegant residences. In the number and character of the trees which shade its streets, it is second only to New Haven, and even this position is disputed by its inhabitants, and the first place claimed instead.

We passed the pier and warehouse erected solely for the accommodation of the *Great Eastern*. There it lay and like the ship itself, to all appearance unemployed. What will be the solution of the problem propounded by this mammoth enterprise, time only can reveal.

There is a question now interesting the people of Maine concerning the discovery and colonization of the State, and as one of the sister States we believe it will be interesting to all your readers. Capt. George Waymouth has the honor of being the first explorer of the coast of Maine or Massachusetts, and the question concerns the river which he is supposed to have entered in 1605, some holding it to be the Sagadahock or Kennebeck, some that it was the Penobscot, and still others give the honor to the river St. George.

Waymouth was fitted out for an exploring expedition from Plymouth, England, to discover the resources of this easterly region of our country. He arrived on this coast early in the season of 1605, and discovered and entered "a great river" which was afterwards always known or believed to be the Sagadahock, by the earlier historians; this river being again visited by Capt. Pien in 1606, and settled in 1607 by Popham. But about the year 1796, Dr. Belknap in his notice of the earlier voyages unsettled this opinion and transferred the honor from the Kennebeck to the Penobscot. All old opinions were thus set aside, and the authority of Hubbard, Prince, and other old historians were disregarded. In 1804, the subject was revised, and the remarks of Dr. Belknap reviewed, and the opinion entertained from the beginning, brought forward and defended in an able article read before the Maine Historical Society of this place by John McKeen, and since published in the collections of this society. Mr. McKeen's view is corroborated by the discovery of a manuscript history written by one Willliam Strackey who was for three years secretary of the Virginia Colony, namely, in the years 1609, 10 and 11; he was one of the patentees, and perfectly familiar with the early voyages. This manuscript history was prepared for the press in Strackey's own handwriting; as prepared it was copied, and both copies deposited, one in the Sloan collection, the other among the Ashmolean manuscripts. One of the copies was dedicated to Sir Francis Bacon, then Lord High Chancelor. Here they remained never having seen the light from the time when they were probably first deposited in 1616 or 17, to 1848, the time when they were discovered and published under the supervision of the Hockluit Society in London, in 1849. This history states distinctly, that Capt. Waymouth discovered "Sixty miles up the most excellent and beneficial river of Sagadahock," (now the Kennebeck). Upon this point Broadhead remarks that Strackey's authority "is conclusive, in favor of the Sagadahock or the Kennebeck," (History of New York, Vol. I., page ix, note). Public opinion seems more to favor this view of the question, and although there are able men who advocate a contrary opinion, still the weight of authority bears strongly in favor of the opinion held by the first historians, and to the effect that Sagadahock or Kennebeck is the river entitled to be considered the initial point of discovery and settlement of the States of Maine and Massachusetts.

Brunswick, where we had the pleasure of stopping a few days, is a rural village and derives its chief importance from the presence of Bowdoin College, the college building and the residences of the professors constituting the chief ornaments of the place. The college was organized in 1794, but did not go into operation until 1802, from which period its active existence may be dated. The college has quite a large library, a minerological cabinet and picture gallery, in which are found life-likenesses of many of the chief personages living at the time and interested in its foundation. The chapel is a fine specimen of architecture, built of stone; its interior consisting of a single nave, and the seats ranged parallel with either side. Above the seats are panels designed for pictures representing biblical scenes, one side is intended for the scenes from the Old Testament, and the other for scenes representing the principal events of the New Testament. Part of these are already painted, but as the work progresses only as individuals contribute funds for each picture; the trustees of the college conceiving it to be improper for them to devote the funds of the college for the purpose, it must necessarily be some time before all the panels are filled. Several, however, have been completed, the cost of each picture varying from two to three hundred dollars, and so far each painting has been donated by some single individual. Among those furnished we notice the picture designed to represent the Annunciation, as being worthy of special attention. Another scene represents the Wise Men of the East guided by the Star of Bethlem, standing over the infant Jesus; and still another represents the healing of the lame man by Peter and John. None of the scenes from the Old Testament have yet been painted.

The accomodations of the students are usually good, and for this they are indebted to a fire which occurred some years since, and destroyed the old buildings including the commons; since which the present buildings which are built of brick, and are ample in proportions, have been erected. They are now *minus* the commons, the students eating their meals out, or clubbing together and employing some female to cook their food for them, in cases where economy is an object.

The village consists of one or two principal streets, on one of which there is a large mall, or public walk shaded with trees. The houses are surrounded by shrubbery, very neat in appearance, and denote industry, thrift and intelligence, as do all the houses in New England villages. The land upon which the place is located as well as that in the neighborhood is all very level, and look which way you will, you can see no hills or mountains on the horizon. This level tract, however, is confined to this locality, the northern part of the State being a desolate mountainous region.

To-morrow we start for Boston, the Athens of America, and after paying our respects to that very respectable place, we shall leave for home. WILLARD.

AMERICAN ENGINEERS' ASSOCIATION.

On Wednesday evening, September 5th, the usual monthly meeting of this association was held at its room, No. 24 Cooper Institute, this city; Louis Koch, chairman *pro tem*, John C. Marriam, secretary.

After disposing with considerable unimportant miscellaneous business, the following gentlemen were elected members of the association:—John Stover, J. D. Webster, W. B. Seaden, A. S. Cameron, Henry L. Davidson and A. S. Wilson, Jr., the subjoined were then proposed for the same object, their election to be acted upon next month:—Hiram A. Farm, James Bogardus, W. Sewell and Calvin Day.

The association then proceeded to the examination of two

NEW INVENTIONS.

Improved Switch.—Mr. Merriam exhibited what he considered an improved switch, invented by Mr. Beech, an engineer employed on the New York and Erie Railroad. The advantages claimed for it are its self-acting principles, its simplicity and reliability. It works with a powerful spring, which, when a train of cars have passed the point where it is situated, resumes its former position, adjusting the track in such a manner as to render it impossible for passing trains to run off the line. There has been one in operation upon the Erie road for some time past, and it is said to work very successfully.

Patent Lubricator.—Mr. John Stover exhibited what he esteemed an improvement in lubricators. He considered the presence of acids and other foreign substances in the large proportion of lubricating oils, very injurious to the parts of engines when applied, eating them away and corroding them to an alarming extent. The novelty claimed in his invention was, that pure suet, which could be purchased for seven cents per pound, was placed in the top of the lubricator, and by compression and the proper arrangement of valves, the pure animal matter without any objectionable substance was thereby obtained for use. Several ferry boats on the North and East rivers, also the steamer *Daniel Drew* had used it some time, and the respective engineers of these vessels deem it a very useful invention. It is as well to state, this lubricator is not designed for use on the main journals of an engine.

These inventions were referred to the appropriate committee, who will report upon their utility when in practical operation.

The committee on "Science and New Inventions" have had great difficulty in regularly making their reports, because of the negligence of those presenting their inventions for examination, an opportunity was not afforded for observing them in working order, and consequently, they had been incapacitated from presenting reports of inventions presented to the society many months since. The committee asked the association to make a change in this respect, after much discussion, during which various opinions were introduced, it was resolved that in future, all inventions should be put in practical operation, so that the committee might examine them without inconvenience to themselves.

An invitation was extended to the association, from the Newark Engineers' Society to be present at their weekly meetings.

The members passed a resolution thanking Com. J. H. Ward, U. N. S., for a copy of his late work on "Steam for the Million."

After a few remarks by Mr. Charles Shrimpton, of this city, explaining his peculiar theory of the high-pressure steam-engine, by economizing the heat, saving the fuel, and preserving the water. The meeting adjourned.

PATENT CASE IN CALIFORNIA.—A very important patent suit, involving large New York interests, terminated recently in California, in the United States Circuit Court, Judge McAllister presiding. The title of the suit was Dietz *vs.* Bragg & Co. The effect of the verdict for the plaintiff is, to sustain Michael A. Dietz's patent for his coal oil burner. The jury gave nominal damages. Dietz will now institute a suit, it is said, to recover the value of burners sold by Bragg & Co., since the commencement of the above suit. It is estimated that Bragg & Co. have sold upwards of $35,000 worth of the burner which is proved to be an infringement on the Dietz patent. During the trial it was shown that coal oil can be made to burn in the common camphene lamp, though at much greater cost.

© 1860 SCIENTIFIC AMERICAN, INC.

GREAT IMPROVEMENT IN THE ELECTRIC LIGHT.

The following clear statement of a most important discovery which has recently been made by M. Gassiot, in the production of light by electricity, we take from the London *Photograpic News.*

A most interesting application of some very elaborate and abstruse researches in physical optics has recently been made by M. Gassiot. It has long been a desideratum to obtain a source of light without heat. Irrespective of the great advantages of such a discovery to the photographer, its value would be almost inestimable in many other branches of science. The surgeon, for instance, has hitherto been compelled to perform many operations—upon which the health, perhaps the life, of his patient depends—almost in the dark; whilst the saving of life which would necessarily follow the introduction of such a safe means of illumination in our coal mines, would be incalculable. M. Gassiot has, we fancy, at last succeeded in solving the problem, and that by an application of some of the most recondite and, to the mere utilitarian, apparently useless, investigations ever commenced by scientific man. It has long been known that, under certain circumstances, the electric discharge from a voltaic battery can be made to traverse short distances across air in the form of an intensely luminous, but at the same time, intensely hot spark. If this discharge is made to pass through a glass tube, by means of platinum wires sealed into the extremities—the air having previously been exhausted from it by means of an air-pump—the discharge assumes an entirely different aspect. Instead of appearing in the form of disconnected sparks, the electric fluid traverses it like a continuous stream of nebulous light, filling the tube with a beautiful phosphorescent glow, whilst the heat almost disappears: on this account it was until very recently, considered that a vacuum conducted electricity. Recent researches have, however shown, that a vacuum really is a non-conductor to the passage of the electric fluid; and that the phenomenon of conduction apparent in the "vacuum tube" was really due to the great conducting power possessed by a highly rarified gas. As soon as this was known, it became a matter of great interest to philosophers to ascertain the various effects which would be produced by having the tubes filled with different sorts of gases, and also what difference was caused by alterations in the size or shape of the vacuum tubes employed. Amongst these experimentalists, M. Gassiot occupied one of the first positions; and, as an adaptation of some of his researches to the wants of every-day life, he has given to the world a ready and simple means of applying the electric discharge from the induction coil to the purposes of illumination. A carbonic and vacuum tube (that is, a tube filled with carbonic acid, which is then exhausted from it by means of an air-pump, until there is only the most infinitesimal trace of gas remaining), having an internal diameter of about 1-16th of an inch, is wound in the form of a flattened spiral; to the ends of the tubes are attached two wider tubes into which platinum wires are sealed: they are inclosed in a wooden case, so as to permit only the spiral to be exposed. When the discharge from a Ruhmkorff's induction apparatus is passed through the vacuum tube, the spiral becomes intensely luminous, exhibiting a brilliant white light. M. Gassiot, who exhibited the instrument in action at a recent meeting of the Royal Society, caused the discharge to pass through two miles of copper wire, showing that it would be applicable to illumination at a distance. The results were brilliant in the extreme; and we confidently predict that this beautiful contribution of abstract science to every-day life will very shortly be one of the most useful and popular forms of the electric light.

SPONTANEOUS COMBUSTION OF SAWDUST.

MESSRS. EDITORS:—An occurrence took place during the night of the 24th ult., in our manufactory that makes it extremely probable that greasy sawdust will ignite spontaneously under suitable circumstances; which in this instance are as follows:—We had, as is usual, used about a bushel of sawdust during the day, in our tempering shop to cleanse the saws after being removed from the oil bath, this operation made the sawdust quite warm and oily, in addition to this it was damp before using, and being left in a compact heap, the result was, that early next morning it was discovered to be on fire, it was, smouldering in the middle of the pile, and almost half of it consumed.

It is proper to remark that it was not used later than 3 P.M., on the previous afternoon, that it was contained in a shallow box on legs three feet from the floor, and men were at work from three to six hours afterwards in the same shop, but not very near to it. It is almost impossible there could have been any fire between the hours of 3 and 10 P.M., without being discovered.

If you think the above facts would be of interest to your readers make what use you please of them.

My two patents are received from Washington, please accept my thanks for the prompt and satisfactory manner with which you managed them, and without any care or trouble on my part.

WILLIAM CLEMSON.

Middletown, N. Y., September 10, 1860.

[It has long been known that some kinds of oil will absorb oxygen so rapidly, as, under certain circumstances to produce ignition. On page 132 of the current volume will be found a paper on this subject, read before the American Association for the Advancement of Science, at Newport, by Professor Horsford, in which he described an apparatus for testing different kinds of oil in this respect, to prove their comparative safety.

THE FIRST STEAMER THAT CROSSED THE ATLANTIC.

MESSRS. EDITORS:—I shall be obliged if you will inform me in your next publication, what the name of the first steamer was that crossed the Atlantic, where she sailed from, and where she arrived at, with dates, &c. W. S.

Columbus, Ga., August 24, 1860.

The first steamship that crossed the Atlantic was the *Savannah*, a ship of 380 tuns, built by Crocker & Fickitt, of this city. Her first voyage was from New York to Savannah, whence she sailed direct for Liverpool, arriving at the latter port on the 21st of September, 1819, after a voyage of 18 days, having used steam only 7. She had an inclined engine placed between decks, and side wheels which could be taken from off the shafts. Her fuel was pine wood. On page 35, Vol. X. (old series) SCIENTIFIC AMERICAN, will be found a full account of the voyage, from which we take the following extract:—

"The arrival of the *Savannah* at Liverpool appears to have created considerable excitement. As she drew near the city with sails furled, and American banners flying, the docks were lined by thousands of people, who greeted her with vociferous cheers. A Liverpool editor said, 'Among the arrivals on the 21st, we were peculiarly gratified and astonished by the novel sight of a fine steamship, which came around at half-past seven, without the assistance of a single sheet, in a style which displayed the power and advantage of the application of steam to vessels of the largest size, being 350 tuns burden.'"

That a ship of 350 tuns should be considered in 1819 a vessel of the largest size, is a very striking proof of the wonderful progress which has been made in the art of shipbuilding in the last 40 years. Vessels of 5,000 tuns are now common, and one has been built of more than 20,000 tuns.

HARDENING OF GUTTA-PERCHA.

MESSRS. EDITORS:—I wish to know if there is anything that can be mixed with gutta-percha, and that will harden when cold; if you know of any suitable substance I would like the information as soon as possible, and I will pay you what is right. W. A. B.

Ware, Mass., August 24, 1860.

[Gutta-percha, after being fused in a close vessel, may be "vulcanized" by kneading it with sulphur, then baking it in an oven at a temperature of 300° Fah. Gutta-percha may also be hardened by kneading it when warm, with plaster-of-paris or plumbago; the latter makes a black compound.—EDS.

THE *Journal de Rouen* states that the medical statistics having shown that several cases of loss of limb, and even death, had occurred from the practice of tatooing so common among seamen, the maritime authorities in France have recommended the discontinuance of the practice.

One of the tunnels on the Baltimore and Ohio Railroad is lined throughout with cast iron, and lighted with gas.

A COLUMN OF VARIETIES.

Two centuries ago not one person in a hundred wore stockings.

Refined coal oil is a solvent of gutta-percha and india-rubber.

The farmers on the Merced river bottoms, in California, plant corn on their grain fields, just after harvest, and never fail to reap a successful crop.

The Illinois Central Railroad is furnished with seventeen miles of cars, with the usual proportion of freight cars; but the grain crops of the State are so enormous, the road is incapable of doing all the transportation required of it.

Trains over the Rutland and Washington railroad are considerably impeded in their passage by the myriads of grasshoppers that lodge on the railroad track, and are crushed beneath the giant wheels of the engine. The track is rendered so slippery and greasy by the crushed mass that it is almost impossible for any headway to be made on the up grades.

According to the London *Times*, water impregnated with lead may be made wholesome by means of well-burnt charcoal—animal charcoal—which may be used either in the manner of the whiting recommended by Dr. Faraday, namely, by stirring up the charcoal in the water and allowing it to subside, or by filtering in the water through a vessel containing the charcoal in coarse powder.

A veterinary surgeon of Dundalk, Ireland, of considerable experience, states that sand is not only an excellent substitute for straw as bedding for horses, but that it is, in many ways, superior to it, as the sand does not heat, but saves the hoofs of the horses. He states that sand is exclusively used for bedding in his stable.

At the Temescal tin mines, the Los Angelos *Star* says, further discoveries of tin mines have been made, extending over a space of several miles. Seventeen distinct leads have been reported, thus far. Much excitement prevails there among discoverers, from the fact that parties from San Francisco are surveying the "tin mountains," to the extent of three leagues, it is said, and covering the same with school-warrants.

The committee of the New Bedford merchants, who have offered premiums amounting to $4,500 for the best lamps designed for burning whale oil, having been requested to grant further time for the completion of lamps for examination, have accordingly extended the time from August 30, 1860, to and including Oct. 1 next. Jos. Grinnell is chairman, and Matthew Howland, secretary of the committee.

From extensive investigation of the subject, M. Constantine Paul, of Paris, has come to the conclusion that unborn children are frequently poisoned to death by the use of lead water by the mother. His paper giving the histories of 81 cases is deposited in the Archives Générales de Medicine, and we find a condensed *resumé* of the work in the Philadelphia *Medical and Surgical Reporter*, which regards M. Paul's conclusions as fully established.

A gridiron is being prepared at Milford Haven, in England, for the purpose of beaching the *Great Eastern*, in order to clean her bottom. It will cost about $5,000.

Pieces of hemp rope which have been fished up from the wreck of the *Royal George*, at Spithead, after a century of submergence, have been found perfectly sound, and they are said to have actually retained the smell of the tar.

The Red Sea and most of the Mediterranean telegraph cables have completely given out. There is now no long line of submarine telegraph in operation in the world. The short lines, however, between England and the continent, continue perfect.

The disease termed "mange" in horses, cattle and dogs, and "scab" in sheep, is produced by the ravages of a variety of mite, *Acarus scabiei*, which burrows in the skin of the animal, causing considerable itching and pain, the development of small vesicles and postules with dryness, scurfiness and baldness of the skin. Scabies in sheep is of very common occurrence. The best preventive of scabies, when a visitation of the disease is apprehended, is cleanliness. The occasional washing of the animals with soap and water, and the friction necessarily employed in the detergent process, will do much towards preventing their skin from becoming a suitable place for the *acari*; for these minute animals, like pigs, delight to dwell in dirty localities.

© 1860 SCIENTIFIC AMERICAN, INC.

THE FARMERS' CLUB ON LIGHTNING.

The Farmers' Club have now had three pow-wows on lightning, an account of the first of these was given on page 150 of the present volume of the SCIENTIFIC AMERICAN. At the second, held on the 3d inst., after several members had related their experience, a Mr. Gilbert gave the subject a new turn by making a statement of some of the established laws of electricity which pertain to the construction of lightning rods. Mr. Gilbert's remarks, although they were of an elementary character and what may be found in any good school book which treats of the subject, appeared quite too profound for the farmers, and the speaker was rather summarily called to order by one of the oldest and ablest of the farmers (an editor of the *Tribune*), who declared that the club could not listen to the fanciful speculations of gentlemen, and that he didn't want anything but facts. This onslaught on science rather discomposed the meeting, and after a few more stories of "hair-breadth 'scapes," the club adjourned.

The third pow-wow was held on the 10th inst., and was opened by the reading of several communications, expressing a variety of opinions, which the chief farmer pronounced good common sense. The letters were followed by short speeches from various members, from which it appeared that one gentleman believed that a lightning rod is a sure protector, another that a lightning rod is extremely dangerous, another that "it's of no consequence" anyhow. Several original theories also were propounded, the most curious of which makes heat and lightning about the same thing; the author of this theory looks at the tip of a lightning rod during a storm with an opera glass, and observes that it is red hot. Finally, it was proposed to appoint a committee to find out if lightning rods are of any use; but the secretary suggesting that the club is a committee, a resolution was passed inviting all men to furnish facts to the club, from which it may be determined if lightning rods are good; and the club adjourned for another set-to on the 17th.

At present the aspect of affairs is rather squally. Suppose the Farmers' Club should go and say that lightning rods ought not to be. Shade of Franklin forbid! We hold our breath again.

But let it not be supposed that we feel disrespectfully towards the Farmers' Club, or would wrongfully speak ill of it. The Farmers' Club is a noble society and has done a great deal of good; we have no safer or higher authority for practical or scientific agriculture. As to facts and theories pertaining to the growing of vegetables, we are willing to defer to farmers, but our deep respect ends with such subjects. And we submit that it is presumptuous in a farmers' club to attempt to teach the world about things of which they have yet to acquire the rudiments of knowledge. *Ne sutor ultra calcem*, that is, let the farmers stick to farming, but if they persist in teaching the people about lightning, let them fortify themselves with a few good school books.

LIGHTNING ON THE RAILROAD.

MESSRS. EDITORS:—The Charlotte (S. C.) Railroad runs 160 feet from my house, and, during thunder and lightning, a succession of cracks is frequently heard along the track, like fire-crackers or the report of a small pistol. Would not this afford ground of diminished apprehension—nay, of comparative safety—from lightning, especially when surrounded by a number of lightning rods, which are attached to adjacent buildings in the village? D. L.

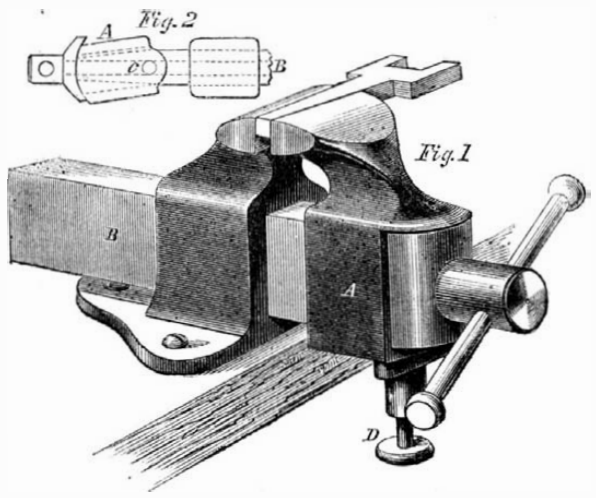
Charlotte, S. C., Sept. 15, 1860.

[Yes, without doubt, unless your house is a meeting-house, set on a hill, and with a tall spire which has no lightning rod. The *dictum* that a rod will protect a circle of a diameter four times the length of the rod is not rigidly true. The real truth, as in many other things which are said, "depends upon circumstances." Get a copper rod, if you can afford it, and do not let it be in metallic contact with the chimney, as the old one was.—EDS.

CLARK'S IMPROVED VISE.

It is well known that it is impossible to hold a tapering piece of iron firmly in the ordinary vise with parallel jaws, and much time is lost in looking about the shop for a piece of thin plate to place under the narrow end of the metal to be held, to prevent it from falling down between the jaws of the vise. The annexed engraving illustrates a little modification of the common parallel vise, which enables it to grasp firmly any tapering body, and a slight adjustment immediately secures the jaws in the usual parallel position.

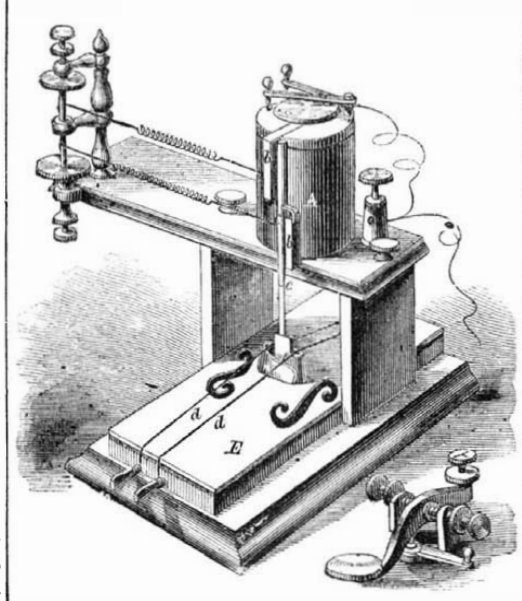
This is effected by securing the movable jaw, A (Figs. 1 and 2), to the sliding bar, B, by means of a pivot, *c* (Fig. 1), so that it may turn horizontally through a small arc, varying to this extent the position in which it stands in relation to the other jaw. The sliding bar must of course be cut away somewhat to permit this motion of the jaw, but as the bar in this part is solid, while there is a groove cut in the other portions of it, the whole bar is not thus weakened. The movable jaw is fastened upon the sliding bar in a position parallel with the other jaw, by means of a pin, D (Fig. 1), which enters a hole in the bar made to receive it, when a quarter of a turn holds it in place. Besides the great convenience of this vise, it is made of elegant form and finely finished, being a veritable ornament to a manufactory.



CLARK'S IMPROVED VISE.

The patent for this invention was granted to C. B. Clark, the inventor, March 16, 1858, and the vises are manufactured by W. T. Nicholson, at Providence, R. I., to whom inquiries for further information in relation to the matter may be addressed.

IMPROVED RELAY AND SOUNDER.



We mentioned, last week, that we should present in this issue an illustration of Dr. Bradley's improved relay magnet and sounding-board, by which far greater delicacy in the magnet was obtained, and local circuits in telegraph offices wholly dispensed with.

The accompanying cut is a representation of this neat little apparatus. A is the helix of copper wire, with the two ends, *b b* (of soft iron, which is made magnetic by the passage of the electricity around it), projecting from the ends of the helix, and bent over along its outer sides. The round armature, *c*, is suspended at its middle by a delicate spring, between the two ends of the magnet, in such a position as to be in close proximity to them throughout the length of the helix, and to be caused to oscillate on its spring fulcrum by the joint action of both ends of the magnet drawing the ends of the armature in opposite directions. Attached to the lower end of the armature is the thin blade of metal, *e*, which has a shovel-shaped enlargement at its lower end for striking the two wires, *d d*, that are stretched on the sounding-board, E. The wires, *d d*, are bridged on each side of the point at which they are struck, by which means they impart but a single wave or vibration to the air, producing a sharp, clear, short sound, without any prolonged musical tone. The spiral spring, G, draws the armature back from the magnet when the circuit is opened, and the action of this spring is rendered more rapid by putting it in a state of tension, which is done by applying a counteracting spring, *g*, to the armature on the opposite side of the fulcrum. This property of springs, by which the rapidity of their action is increased without increasing their power, is an important discovery in mechanics made by Dr. Bradley.

In winding the helix, after a certain number of layers of wire, a loop is brought up and connected with a brass knob in the end of the helix; and, in the course of the winding, similar loops divide the helix into a number of concentric sections. As electricity always takes the shortest road along conductors equally good, if one end of the conducting wire is fastened to the helical wire at its inner end, and the other end of the conducting wire is connected with the inner section by its brass knob, the flow of electricity will be only through the innner section of the helix, and, by connecting with the different knobs, any desired portion of the helix may be brought into the current. To facilitate this adjustment of the helix, two levers, *h*, are secured to the top of the helix, in such a manner that one end of each may be placed readily in contact with either of the brass knobs which are placed in a circle concentric with the fulcrum of the levers.

The form in which this magnet is constructed, by affording a large amount of attracting surface and by securing the action of the electricity on both the inner and outer surfaces of the helix, obtains a larger amount of attractive power from a given length of helical wire than is realized from the ordinary magnet with the double helix; and in practice, it is found that the iron becomes magnetic, and is demagnetized more rapidly and completely than is the case in the old relay. The hanging of the armature, too, in this magnet is so delicate that it acts without any difficulty from the current of the main line, requiring no local current; and the sounding-board so increases the loudness of the knocks that they are read by the ear with the greatest facility. It has been tried on the lines between New York and Boston, and on those between New York and Montreal, and invariably gives the highest satisfaction to the operators. The apparatus above described, with the key represented in the corner of the cut, is all the apparatus required for telegraphing, in addition to the main wire and batteries. It will be understood that this does not embrace Dr. Bradley's recording apparatus, spoken of in our last week's issue, by which he can transmit 15,000 words in an hour. The action of this is limited by the power of the hand and ear to make and interpret telegraphic signals.

The patent for this invention was granted on August 28, 1860; and further information in relation to it may be obtained by addressing the inventor, Dr. L. Bradley, 38 Pine-street, New York city.

A STRAWBERRY has been produced in England over 3 inches in diameter; the size of a very large apple.

© 1860 SCIENTIFIC AMERICAN, INC.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum—One Dollar in advance, and the remainder in six months.

Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada.

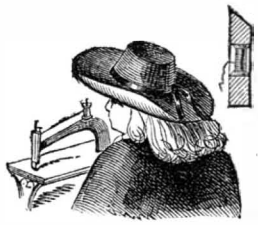
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

☞ See Prospectus on last page. No Traveling Agents employed.

VOL. III., No. 13....[NEW SERIES.]....*Sixteenth Year.*

NEW YORK, SATURDAY, SEPTEMBER 22, 1860.

REMARKS ON HOWE'S SEWING MACHINE EXTENSION CASE.



IN our last number, we announced in a brief paragraph, that the Sewing Machine Patent of Elias Howe, Jr., had been extended by the Commissioner of Patents for seven years. The fact well-known to the public, that the patentee had realized a large fortune from his invention, together with the severe manner in which the application was discussed by a portion of the newspaper press of this and other cities, led to a very general conviction that the patent would not be extended.

There are some who do not hesitate to denounce the action of the Commissioner of Patents in this matter, and accuse him of being influenced by improper motives. This we cannot but regard as unjust, for upon a fair and candid review of the testimony brought to bear in favor of the extension, and which was nowhere impeached, the fact is fully established that the sewing machine is one of the most valuable and important inventions ever made, and that no invention of greater value has ever been secured by Letters Patent in this country, and without which security every invention would be entirely at the mercy of the public.

In acting upon such cases, the Commissioner assumes a grave and important duty, one which he is bound to discharge in an upright and conscientious manner, and upon such sworn evidence as is presented to him on the trial. We incline to the opinion that in this case the general verdict of the public will be, that as a judicial decision, it is based on sound and correct principles. Let every unprejudiced reader make this case his own, and take into consideration the leading facts and circumstances connected with it. In the first place, we do not believe there is a single inventor past or present, who under the same circumstances, would not have applied for an extension of his patent, and strenuously advocated the justice of his claim. It must be borne in mind also, that notwithstanding all the clamor which is made about it, Howe produced an original invention, one of great importance, even though it were but the foundation stone of many others of more or less value. He did not simply take what others had done, and by adding a little here, taking off a little there, produce an improvement or some new and patentable combination. He struck out into a new and comparatively unknown field of research, and he met success; not only this, but he began life a poor inventor, and had to contend sharply with poverty and prejudice, and was at times almost reduced to beggary. It was only after the first seven years of his patent had expired, that he began to realize any profit from his invention. It is true that Howe has realized within the past six years, a large sum of money for his invention, while it is also true that he has freely expended it—not in riotous living, but in such ways as are always acceptable to a community. We can testify from our professional experience, that there are many cases where the poor but worthy brother inventor, has received from Howe substantial and much-needed aid; while if he had gone to those who had maglined Howe and his motives, his case would have been met with the cold shoulder and the frown. We admit that such considerations as these, will not weigh as arguments to support a bad cause; but we do say that the inventor who uses the means acquired from his discoveries to advance the welfare of his race, and does not stingily shut up his bowels of compassion against those who seek and need his friendly aid, is justly entitled to more of the substantials of life than are those who spurn the inventor as a poor deluded being.

The question is not simply how much has an inventor made out of his patent—but, is his invention valuable to the public? Has he used due dilligence to introduce it? Has he been sufficiently remunerated for the invention, considering its value? and has the public respected the rights of the patentee?

In a case, in England, where the parties holding the patent had made a very large sum of money, but where it was shown that infringers had invaded the rights of the patentees, Lord Brougham, in giving the judgment of the Privy Conncil, expressly stated, in granting the extension, that it was not because the patentees had not made large profits, but because others had unfairly attempted to obtain possession of the invention before the patent had expired, and that they ought to be taught to respect the rights of others. Howe's case, it seems to us, is one parallel to this, and we think the judgment of Lord Brougham might have been properly applied to it.

The public has its rights, but it has not a right to deprive the inventor of the peaceful possession and proper use of his invention, as contemplated by law, and it is high time that this principle was more generally recognized and respected.

Mr. Howe will now enjoy his invention for a term of seven years, and then it will become the property of the public forever, as it will never again be extended.

We confess to a surprise at the opposition which arrayed itself at the Patent Office against this extension. It was weak and impotent, and just such opposition as could have but little influence. It consisted principally of those who were known infringers of Howe's patent; and the singlular spectacle was also presented of a patent agent appearing, without client or friend, to fight on his own hook.

There are some interesting statements in connection with this case published on another page. The fact is established beyond controversy that the first practical sewing machine was the invention of one of our own countrymen.

COMMERCIAL STEAMERS AS SHIPS OF WAR.

The most important step in diplomacy ever taken by the United States government was the refusal to give up the right to employ merchant ships as volunteers in case of war. The ablest diplomatists of the seven principal European nations had met and agreed to abolish privateering, and this country was invited to become a party to this great change in the law of nations. Secretary Marcy's dispatch, in reply to this invitation, has always seemed to us to afford more just grounds of pride to its author than any other document that ever issued from the American Cabinet. His reasons for declining the invitation were so conclusive that they were virtually assented to by both Louis Napoleon and Lord Palmerston, the leading minds who proposed the change. One reason that Mr. Marcy advanced, though not prominently, has always seemed to us the conclusive ground for refusing to assent to this change; that is, the absolute certainty that none of the governments would fulfill their engagements when the time of trial should come. It is so easy to change a private vessel into a government vessel. For instance, instead of issuing letters of marque, a government might buy all the vessels that offered, and pay for them out of the captures they could make. How much ownership in a vessel on the part of government does it take to make her a naval vessel? As Mr. Marcy said, it is impossible to draw the line.

The soundness of this position is absolutely established by a discussion that is now going on in England, in regard to the changing of commercial steamers into ships of war. A committee of the House of Commons has been appointed to investigate the matter, and, in the regular English way, they have taken a great deal of testimony from masters of steamships, naval officers, and others familiar with the subject. The universal opinion is that the scheme is practicable, and there can be little if any doubt, that measures will be taken to facilitate the change in case of war by the British government. Is it not well worth the attention of our own?

THE RELATION OF SCIENCE TO THE INDUSTRIAL ARTS.

In another part of this paper will be found an illustrated description of the application of the gyrascope to the regulation of the speed of marine engines. It is a practical and valuable invention, which accomplishes by this novel means a result that has eluded the efforts of all inventors using the properties of matter heretofore employed in the arts. When the gyrascope was introduced, a few years since, to the attention of the community, it was regarded as a scientific toy, and no one ever dreamed that it could ever be made of any use in the practical affairs of life. This fact illustrates the relation between pure science and industrial art which has indeed been abundantly proved, but which is not, by any means, generally recognized. "What is the use?" is the very common question when some great but apparently barren discovery is made in abstract science.

Hidden in his obscure laboratory, among his retorts and crucibles, the chemist is intently engaged in ascertaining the relative affinity of oxygen for sodium and for aluminum. The practical man passes by with a sneer at this utter waste of intellectual labor. The chemist plods on a few years, and lo! the world is endowed with a new metal, of rare, peculiar and invaluable properties.

Learned geologists meet and dispute, almost with fierceness, the relative ages of certain rocks which were deposited in the bottoms of unknown seas in the immeasurable ages of the past. "How utterly useless!" says the legislator, engaged in the discussion of railway bills and other measures of immediate necessity. But this science also vindicates its claim to utility; and all bodies of legislators find that there is no more profitable employment of the public money than in having geological surveys made of their respective States.

The most surprising instance, however, of pure science proving useful to man, is furnished by astronomy. The heavenly bodies are so immensely distant, so absolutely unapproachable, that it must have been impossible to conceive that a knowledge of them could ever be of any practical value to the world. How certain must have been the money making merchant of early times that the star-gazer was a useless cumberer of the earth! But this knowledge of the heavenly bodies is the thing which guides the merchant's ships in safety over the seas, and brings his cargoes to their profitable market.

It is irrational to say that any item of knowledge, however abstract or remote from the common affairs of life, may not be turned to useful account in some of the complicated operations of modern art. Among all the evidences of design and benevolence which are afforded by the works of creation, there is none more impressive than the wonderful variety which characterizes the human race. Some men like to pass their lives in roaming over the ocean, and others in tilling the earth; to many is afforded a peculiar gratification in the accomplishment of difficult undertakings or the triumphs of mechanical skill, while a select few find the purest and highest enjoyment in the pursuit of abstract knowledge, without any reference whatever to its application to the affairs of life. In organized society these several tastes find each its sphere of action, and thus Science and the Industrial Arts labor harmoniously together, both alike conducive to the improvement and well being of the human race.

THE WAY THE SOLAR SYSTEM WAS FORMED.

Our readers are aware that the modern discoveries in astronomy have lead to the development of a theory, by Laplace and others, in regard to the mode in which our earth and the other bodies of the solar system were originally formed from chaotic matter into their present shapes, and caused to move with such wonderful harmony in their orbits. The theory is, that the matter of which the solar system is composed existed, at the earliest period of which we have any evidence of its condition, in the state of a fiery cloud or vapor, of a lense shape, and filling an immense extent in space. Laplace supposes that as all this hot mass radiated its heat into surrounding space, it was drawn together by the mutual attraction of its particles, and he says, "this drawing together would result in a rotation of the whole mass around its center of gravity." He supposes that this rotation would, as the condensation proceeded,

© 1860 SCIENTIFIC AMERICAN, INC.

throw off rings on the outside which would be drawn by the mutual attraction of the particles into globes constituting the planets; while the great mass would be drawn together in the center, forming the sun.

Infidels have asked triumphantly how light could have been made on the first day of creation, while the sun, moon and stars were not made until the third day. Religious geologists—such as Professor Silliman, Rev. Pye Smith and Hugh Miller—now insist that the word "day" in Genesis does not mean 24 of our present hours, but immensely long periods of time; and pious astronomers, like Professor Mitchell, have accepted the nebular hypothesis as being in beautiful harmony with the Bible.

Professor J. Stanley Grimes, of Lansingburg, in this State, has devoted most of his time for some years to the study of the nebular hypothesis, and has developed a theory of his own, in accordance with Kepler, Newton and Sir William Herschel, as far as they go, but differing entirely from Laplace in the details suggested by him. On another page will be found a letter from Professor Grimes, briefly expounding his theory. If the theory itself does not finally command the assent of astronomers, the wonderful mathematical law which he has discovered in his investigations cannot fail of, at least, arresting their attention.

AWFUL STEAMBOAT DISASTER.

On the night of Sept. 7-8, the steamer *Lady Elgin* was sunk in Lake Michigan, causing the loss of some 300 lives. The *Lady Elgin* left Chicago at half-past 11 o'clock in the night (Sept. 7), for Lake Superior, having on board three military companies and several fire companies belonging to Milwaukie, who were returning home from a visit to Chicago. At half-past 2 o'clock, when off Waukegan, which is situated in the northern part of Illinois, on the western shore of Lake Michigan, about half-way between Chicago and Milwaukie, the steamer came in collision with the schooner *Augusta*, and sunk in half an hour in 300 feet of water. Just before the collision a violent squall of wind and rain struck the vessels, which were going in opposite directions, the schooner steering East by South, and the steamer North-east. Capt. Malott, of the schooner, says that he saw the steamer's lights, and when he perceived that a collision was probable he ordered the helm hard up, but the vessel "steers wild' and refused to obey her helm, the consequence of which was that she came with a crash against the larboard side of the steamer, just forward of the wheelhouse. The *Augusta's* head gear, jib boom and stanchions were carried away, and, in the storm and darkness, the vessels drifted asunder. As the steamer went down, the hurricane deck broke away from the hull and continued to float on the surface, bearing up Capt. Wilson and a number of passengers who were on it at the time. Others of the passengers supported themselves on fragments of the wreck and on plank life preservers. Though the water was rough it was, fortunately, not cold, and the gale was blowing directly towards the shore, which was about ten miles distant. A large portion of the hurricane deck, though forming a frail raft for so rough a sea, continued to hold together, and, surrounded by hundreds of persons clinging to planks or pieces of the wreck, or struggling hopelessly in the water, drifted slowly towards the shore. Capt. Wilson, as cool as if he was on his own deck, busied himself in fastening loops to the edge of the raft, for persons to cling to in case they were washed overboard. The greatest danger was encountered as the shore was reached in the morning. The waves were breaking in white foam on the beach, and though the shore beyond was crowded with hundreds of sympathising friends, they were utterly powerless to aid those who were struggling in the waves. The raft was rolled over in the breakers, of course washing off all who were upon it, more than two thirds of whom perished—Capt. Wilson among the number. Numbers of passengers came ashore on other fragments or pieces of furniture. One woman floated alone, the whole ten miles, on a dining table, and though tumbled over and knocked about among the breakers, finally reached the shore in safety. The most intense interest was excited among the spectators on the shore by the heroic struggles of one gentleman who was clinging to his wife with his left arm, while with his right he was battling the waves. He was repeatedly swept back into the foaming yeast, but, with noble affection, he preserved his hold upon his precious burden, and finally succeeded in bringing her safely to land.

Out of about 400 persons on board, only 98 are known to have been saved.

THE LATE HERBERT INGRAM, M.P., PROPRIETOR OF THE "ILLUSTRATED LONDON NEWS."

We are indebted to Mr. John Cassell, the enterprising publisher of various illustrated works, for the following brief biographical notice of the late Mr, Ingram:—

The late Herbert Ingram was a native of the town which he had the honor to represent in the British Parliament—Boston, Lincolnshire—his family having resided in the neighborhood of that city for generations, as is recorded in Thompson's "History of Boston." In the family of the subject of our memoir a good custom has been kept up of calling the eldest son Herbert, and the honorable member for Boston is lineally the seventh who has borne that name. He was born on the 27th of May, 1811, and is, consequently in his fiftieth year. His early years were spent in his native town, and there he was apprenticed to the printing business. After completing the term of his indenture, he removed to Nottingham, where he carried on business as printer, bookseller and news-agent. In alluding, at an annual dinner, in London, of the Newsvenders' Benevolent and Provident Institution, to this circumstance, Mr, Ingram said:—"He knew very well what hard work a newsvender had in carrying on his business, at all hours, and in all sorts of weather. He had been a newsvender himself, and he believed that when he was at Nottingham, there was not a man in the whole kingdom, more industrious than himself. As one instance, he might mention that there was among his customers a gentleman who wanted his paper very early; and he (Mr. Ingram) was so anxious that this gentleman should not be disappointed, that he walked five miles (and of course five miles back), to supply a single paper. On one occasion he got up at two in the morning, and traveled to London to get some copies of a paper, because there was no post to bring them, being determined that his customers should have the paper." His industry had its reward, for he sold above 1,000 copies of that paper in Nottingham alone. That was not the only reward of his exertion.

It was from the experience he had as a newsvender, and in the sale of those very papers, that he thought of the journal with which, up to the period of his death, he was connected. He used to notice that even a very bad wood-cut in an odd number of a paper would make it sell more than usual; and it occurred to him that if they had a number of good engravings, and put them in every paper, a paper conducted on such a principle must succeed. Such was the origin of Mr. Ingram's paper; and whatever its present condition, it is simply owing to Mr. Ingram's immediate connection with the news trade. The very title was suggested by the fact that many of his customers, especially the more illiterate, would come and ask for the "London News;" they did not care whether he gave them the *Dispatch* or *Bell's Life*, or anything else, so long as it contained the London news: so he thought if the name suited the common people it would suit all classes, and he called his paper the *London News*, putting *Illustrated* before it on account of its pictures.

The first number of the *Illustrated London News* appeared in May, 1842; and it is interesting to trace the gradual improvements introduced, from the somewhat rough wood-cuts to those splendid specimens of oil color painting—one of which, a magnificent view of the Falls of Niagara—was issued with a very recent number of the paper.

Mr Ingram's long and successful connection with a journal so widely circulated, made him, to all intents and purposes, a public man, therefore on the retirement of Sir Gilbert Heathcote, from the representation of Boston, in Parliament, Mr. Ingram presented himself as a candidate for his native town. There were two other candidates; one retired before the election, the other went to the poll, but Mr. Ingram was returned with an overwhelming majority, namely, 521 to 296. What rendered Mr. Ingram so popular was the fact that he was born in the town, that he had risen to the positio which he occupied by his own unaided efforts, and that he took a lively interest in everything that appertained to the moral, intellectual, sanitary and commercial advancement of his native place. Boston, with all its advantages, natural and acquired, was, nevertheless, deprived of that greatest of sanitary blessings, pure water; and the inhabitants were, in consequence, much afflicted with ague. Through the exertion of Mr. Ingram they are abundantly supplied with the purest water; and Boston is now reckoned one of the healthiest towns in England. Mnch, however, as the inhabitants were beholden to him for the establishment of the water-works, they owe him as the principal promoter of the Boston and Nottingham Railroad, of which he was the chairman, a deep and lasting debt of gratitude. He was also director of the Great Eastern Steamship Company, and he and his lady were on board the monster ship when the unfortunate explosion took place on the "trial trip."

On the occasion of his election, and while he was addressing the people from the balcony of his committee room, it was mentioned to him that a number of boys were looking up, and listening to what was going on. Mr. Ingram stopped in the midst of his speech, and looking down at these lads said: "I well remember standing like you, on several occasions similar to this, listening to the successful candidate returning thanks to his constituents, and little did I think that I should one day occupy the same proud and honorable position as the elected member for Boston; and you, boys, cannot tell to what you may attain, if you are good, honest, industrious, upright and persevering in your various occupations." It was by such touches of nature as these that Mr. Ingram became so popular at Boston, more especially with the humbler classes of electors. In returning thanks from the hustings, he spoke of the honorable pride which he felt in returning thanks to the inhabitants of his native town, and in returning those thanks on the very spot upon which the house formerly stood in which he was born. At the last election, after the dissolution of parliament, Mr. Ingram was returned for Boston without opposition. He was also a magistrate for the county of Herts, and deputy-lieutenant for the county of Lincoln.

It remains for us simply to state, that the subject of this brief memoir, as well as his eldest son, Herbert, were drowned on board the *Lady Elgin* steamer, on Lake Michigan, and Mr. Ingram has left a widow, seven children, and a large circle of admiring friends to deplore his untimely fate. In his death, the press has lost one of its ablest coadjutors—the public, a benefactor—and the poor, a friend.

THE special correspondent of the SCIENTIFIC AMERICAN, Mr. Henry S. Olcott, has gone to attend the Fairs of the Ohio Mechanics' Institute and the United States Agricultural Society now in progress in Cincinnati. He will write several letters for this journal, giving an account of all such matters as may be interesting to our readers.

OUR WESTERN CORRESPONDENCE.

Horrible Highways—Stagnation of Trade—An Iron Jail—The Pacific Railroad—Stampede of Settlers—Poverty at Pike's Peak.

LAWRENCE, K. T., August, 16, 1860.

MESSRS. EDITORS:—On August 9th, I left Kansas City, Mo., by the stage for Lawrence, Kansas Territory, and passed over a very fair macadamized road for about five miles, which brought us to Westport. The laying out of this highway, as is generally the case, is not as good as its surface. People need "line upon line and precept upon precept," in this matter of common roads. When will the authorities discover that the all important point is to secure a good location at first, and leave construction and surfacing till a subsequent period, if there is not money enough in hand to do all that is requisite at the first? Correct locations will never be obtained without the employment of competent and trustworthy engineers. It seems almost futile to hope for much improvement in this respect out West; there is such a rage for running the public roads on the farm and section lines, instead of having them governed by the natural lie of the ground. I am glad to notice that some

© 1860 SCIENTIFIC AMERICAN, INC.

of the journals in Kansas (the Lawrence *Republican* amongst others) take a right view of this matter.

The corn along the road from Westport to Lawrence bore sad evidence of the severity of the drought. Should there not very soon come a good rain, the consequences will be deplorable. It requires a good harvest, this year, to lift the territory in a great measure out of her financial difficulties; but as it is, I do not look for much amendment till we have another crop. Great numbers of persons are leaving the country; most of them, however, will probably return in the Spring, for they are merely going "to put in the winter" in some State where money can be had for labor.

Lawrence is no exception to the general stagnation of trade in the territorial towns; some few buildings, however, are going on in spite of the hard times, and among them a very excellent jail—a structure much needed, by the way, as formerly it was found almost impossible to retain the "public boarders" in the dwelling provided by the generous people for their accommodation. The building in question is a complete shell of iron, put together with much care, perfectly smooth on the inside, so as to defy all efforts of those confined to liberate themselves, as well as snfficiently strong to frustrate the attempts of outside friends towards the same end. There will be a brick facing, with intervening space, outside the iron shell; of course the whole affair will be completely fire-proof. The latter fact shows a wise act on the part of the projectors; every public building should be fire-proof, and the more private ones of the same character, the better. This jail will be quite an expensive structure at first, as may well be imagined, but I doubt not will prove to be economical in the end.

There is considerable talk abont making a railroad from Leavenworth City to this place and thence westward up the Kansas valley. No lines can be started at present, in the territory, that have not got land in some way or other to aid in their construction; there is no money here to do anything of the sort. Pity we can't have some of the extra capital that is afflicting your city for some months past with a pecuniary plethora. Whatever mercantile diseases we may suffer from, most assuredly there is little danger on the score of too great abundance of the circulating medium. The above line, they say is in a rather better condition than the other legion of projected railroads, inasmuch as the company have managed to get hold of over 200,000 acres of good land, that was part of the Delaware Reservation. This is not a free land grant; they will have to buy it, though no doubt at a price that will enable them ultimately to sell it at such a profit as will allow them to go on with their road. In time there must be a line from Lawrence eastward to connect with the Missouri section of the Pacific Railroad. As I said before, the natural locality for the most important line in Kansas to traverse, is up the valley of the Kaw river from its mouth, keeping near it the whole way, through the settlements, and finally striking, by the most favorable route for the gold diggings of the Rocky Mountains. But the country is cursed with a superabundance of railroad projects, as she is with worthless little speculators' towns; and rival interests mar natural advantages to such an extent that everything is at a dead lock, and no progress made. For instance, there are no less than three opposition schemes for a railroad up the Kaw or Kansas valley! If five-sixths of the railroad companies were disbanded, and about the same proportion of the "cities" plowed and made into corn fields, the country would be infinitely the gainer.

By way of fostering internal improvements, possibly, they have been "firing up" again in Leavenworth City. No one can fairly say she does not do her full part in the conflagration line; why she rivals San Francisco in a small way! I remarked some very creditable efforts in that direction since my last visit; they did not have an "underwriter's illumination," however, on the night of my arrival, this time, so I am unable to report what improvements have been effected in the fire department, but, judging by their practice, it seems probable that they have kept pace with the times.

The road from Leavenworth to Lawrence was thickly dotted with the wagons and teams of returning settlers, driven out by the hard times. Poor fellows, some of them did look as if they had not been reposing on a bed of roses (or any other) latterly. They say, here, that those who are thus running away are not of the "true grit"—that they were new comers and not fit for Kansas life; but when a person has no food, no money to buy any, and cannot get work, what is he to do? He must steal, starve, or "up stakes" and leave for other diggings.

Accounts from Pike's Peak are not of the most favorable nature. A man from that locality has told me that there are hundreds who would be glad to work for their board during the winter, if they could get it, but they cannot do so. E. M. RICHARDS.

RECENT AMERICAN INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions, the reader is referred to the official list on another page:—

HANGING MILLSTONES.

The object of this invention is to allow the "runner" or revolving stone of a pair of millstones to have a certain degree of independent lateral movement, so that they may adjust and balance themselves perfectly on the spindle by virtue of their own rotation. To this end, a flat bearing plate is employed, said plate being placed in a suitable recess in the under side of the balance iron, of sufficient dimensions to admit of the lateral adjusting movement of the runner; the bearing plate resting on the top of the spindle. Z. McDaniel, of Bowling Green, Ky., is the patentee.

COTTON CLEANER.

S. C. Ames, of Washington, Ark., is the inventor of an improved machine, which has for its object the removal of dirt and trash from the cotton, preparatory to or after the ginning of the same, so that the staple may be baled or prepared for market in a clean state, and its value very materially enhanced thereby. The invention consists in the use of a stationary screen of polygonal, cylindrical or other form; said screen being divided into compartments by vertical partitions, and each compartment provided with rotary beaters; the screen is placed within a suitable case, and all the parts are so arranged that the cotton will, by the rotation of the beaters, be forced around and through the several compartments of the screen, and thoroughly cleaned.

SEWING MACHINE.

This invention (patented by Dwight Tracy, of Worcester, Mass.) consists in an improved means of controlling the needle thread of a sewing machine, whereby the quantity supplied to the needle is caused to be always in proportion to the thickness of the cloth or other material being sewed and to the length of the feed movement, and a uniform tightness of stitch is produced, whatever variation may occur in the thickness of the material, or however the feed movement may be varied, or whatever may be the relative sizes of the needle and thread, obviating entirely the necessity of any manual adjustment for the needle thread. It also consists in an improved means of controlling the shuttle thread in such a way that it is caused to be drawn to a uniform tightness in the cloth or other material, whatever may be the quantity of thread on the bobbin, or from whatever part of the bobbin the thread may be drawn. It further consists in a certain means, operating, in combination with a needle and a double-pointed and double-acting shuttle, for the purpose of forming a a knotted stitch of peculiar character.

CURING WOOD.

Many unsuccessful attempts have been made to obtain a perfect substitute for whalebone for the manufacture of the ribs of umbrellas and parasols. Jonathan Ball, of Elmira, N. Y., has found that, by selecting the butt end of white oak timber, of what is termed the "second growth," and of straight rift and free from knots or curls, and, in no case, using more than six feet from the ground or stump, and subjecting it to a certain process of curing (which is explained by his claim in our last week's issue), it is made to serve not merely as a substitute for whalebone, but is converted into an altogether superior article, as it is not only tougher and possesses greater tenacity than whalebone, but the ribs made from it always resume their straight condition after exposure to the weather.

ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING SEPTEMBER 11, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

29,943.—O. P. Allen, of Rindge, N. H., for an Improved Clothes-dryer:

I claim a clothes-dryer having in combination the metallic brackets, B D, with sleeves, c, and flanges, d, rivets or wires, a b, ropes, g g, arms, A, braces, C, and post, E, and operating as and for the purpose set forth.

[This invention consists in arranging the metallic guide brackets, which support the arms and the braces with sleeves or rings and flanges in such a manner that the ends of the arms and braces rest against the rings and flanges, and that said arms and braces do not depend entirely upon the rivet or hinge for support.]

29,944.—Sampson American, of Chicago, Ill., for a Composition for Toilet:

I claim a compound formed by the admixture of the oil of turpentine, alkanet root, alum, the oil of roses and the oil of neroli, substantially in the manner and for the purposes specified.

29,945.—S. C. Ames, of Washington, Ark., for an Improvement in CottonCleaners:

I claim the employment or use of a screen, C, divided into two or more compartments communicating with each other, and provided with beaters, f, and one or more of them provided with oblique deflecting blocks, i, the latter being arranged relatively with the opening or openings, h, to give the cotton a lateral movement from one compartment to the other, substantially as and for the purpose set forth.

I further claim, in connection with the screen, C, the case or box, A, provided with the ledge or projection, l, at its upper part, the case being so arranged over the screen as to allow spaces, j j, at each side of it, for the purpose set forth.

29,946.—David Barger, of Columbia, N. Y., for an Improvement in Threshing Machines:

I claim the combination and arrangement of the adjustable blast board, m′, hook, l′, staples, n′ n″ n‴, upper shoe, s′, lower shoe, u′, furnished with sieves, numbered 1 2 3 and 4, operated by the two connecting bars, m and h, working on opposite sides of the winnower and from the same shaft, as specified.

29,947.—Everett Bass, of Calhoun County, Ga., for an Improvement in Tightening Tires on Wheels:

I claim the arrangement of the clasp, H, slips, X, key, F, plate bolt head, B, and inner plate, S, when used for the purposes described.

29,948.—L. A. Beardsley, of South Edmeston, N. Y., for an Improvement in Hay Elevating Forks.

I claim the gang forks, A A, jointed together, as set fo th, with the chains, c, and B B, attached to them, in combination with the tripping latch, e, tripping plate, g, and loop, C, arranged and operating substantially in the manner and for the purposes set forth.

[This invention consists in constructing a device for elevating hay by a rope or chain and pulleys, in such a manner that the bundle of hay to be elevated will be grasped tightly by four curved teeth and held compactly by said teeth while it is being elevated; and when the hay is to be discharged a latch and chain is so applied to the teeth that by jerking a string attached to the latch, the teeth will open, and allow the bundle of hay to fall.]

29,949.—Leonard Bricker, of Springfield, Ill., for an Improved Combination of Smoothing Iron and Lamp:

I claim the arrangement and combination of the lamp with elevated tube, B, and guard, C C, dovetail, A A, and smoothing iron, all in the manner and for the purpose described.

29,950.—H. R. Burger, of Richmond, Va., for an Improved Machine for Grinding Saws:

I claim, first, So arranging the saw-supporting disk, shaft, I, the feed carriage and the gearing, that said shaft is moved laterally independently of the carriage and simultaneously therewith, the shaft and carriage moved together longitudinally, substantially as and for the purposes set forth.

Second, The combination of the gage-stop, R, and its adjusting screws, with the sliding shaft, I, and the mechanism by which it is controlled and actuated, substantially as and for the purposes set forth.

27,951.—E. W. Cady, of Tomah, Wis., for an Improvement in Self-adjusting Braces for Jack Screws or other Hoisting Apparatus:

I claim the combination of a self-adjusting brace, composed of the arms, D D F F, and the evener, E, and constructed substantially as set forth.

29,952.—M. C. Chamberlin, of Johnsonsburg, N. Y., for an Improvement in Self-detachable Whiffletrees for Vehicles:

I claim the combination of the bell cranks, a a, with the rods, d d, and the sleeve, c, when the same are used substantially as and for the purpose specified.

29,953.—D. W. Clark, of Stratford, Conn., for an Improvement in Stirrups:

I claim the employment within the stirrup A, of a laterally adjustable bar, B, substantially in the manner and for the purpose shown and described.

29,954.—George Collyear, of Appoquinnimink Hundred, Del., and A. H. Patterson, of Philadelphia, Pa., for an Improvement in Couplings for City Railroads:

We claim, first, The shoulder, a, constructed and arranged in the manner and for the purpose substantially as set forth.

Second, The attachment, D, for joining the box to the car, constructed and arranged substantially as set forth.

29,955.—S. L. Donnell, of South Carroll, Tenn., for an Improved Grading Instrument:

I claim the arrangement of the suspended bubble block, N, with the sliding weights, d, plumb, I, turning table, H, and supporting rod, R, substantially in the manner and for the purpose described

© 1860 SCIENTIFIC AMERICAN, INC.

29,956.—J. H. Dunbar, of Plymouth, Conn., for an Improved Saw Clamp:

I claim an improved article of manufacture, viz., the slotted jaws a, fulcrum pin or bolt, d, having the collar, e, nut, g in combination with the lever cam, i, substantially as and for the purpose deseribed.

29,957.—Wright Duryea, of New York City, for an Improved Device for Joining Boxes:

I claim the joining of the ends of boxes by the insertion of the angular strips of metal into the corners of the box, substantially as set forth.

[This invention and improvement in the construction of boxes relates to the joining of the ends in a more perfect, neat, and efficient manner than can be done with nails, glue, or by dovetailing. The invention consists in the employment of angular strips of metal, which are inserted endwise into slats, cut into the mitered ends of the box stuff, so that these strips when inserted will bind and secure the corners tightly together.]

29,958.—Matthew Elder, of Lansing, Mich., for an Improvement in Brick Molds:

I claim, first, The arrangement of the compartment frame and the respective followers, G G, with the pairs of rods, a a, and b b, the crossheads, F F, the short bolts c c, the longitudinal bars, E E, and the connecting arms, d d, in such a manner that the said compartment frame can be entirely withdrawn from the sides and ends of the molded bricks, whilst the followers remained stationary, substantially in the manner set forth.

I also claim the interposition of the springs, e e, or their equivalents, between the crossheads, F F, and the ends of the longitudinal bars E E, when the said parts bear such a relation to the other parts of my improved brick mold that the followers, G G, will remain stationary whilst the compartment frame is being drawn past them, and then the said followers and frame may be simultaneously elevated a short distance, whilst the crossheads, E F, remain in a stationary position upon the rods a a, by which I effect a clear and clean separation of the compartment frame, and the followers from the molded bricks, substantially in the manner set forth.

29,959.—E. G. Elliott, of Elk Horn, Wis., for an Improvement in Watches:

I claim the combination of the revolving banking piece, e, the pin, or projection, K, on the balance wheel or staff, and the stationary banking pin, l, substantially as and for the purpose specified.

[The object of this invention is to obtain for the balance wheel a very high speed, and a great range of vibration of so positive a character that no shaking can change it; and to these ends in a detent lever of peculiar construction applied in a peculiar manner in combination with the balance staff and with the escape wheel and, in a revolving banking piece applied to the staff of the balance.]

29,960.—A. H. Emery, of New York City, for an Improvement in Anti-friction Presses:

I claim the combination and arrangement of the described press, constructed and operating substantially as described.

29,961.—M. H. Ferguson, of Sunfish, Ohio, for an Improvement in Feeding Grain to Mills:

I claim the combination of the cup, M, adjusting tube, K, block, O, and pipes or tubes, P, leading far down into the eye of the runner, and used in connection with the draft of air, the whole forming a feeding device, and operating substantially in the manner and for the purpose set forth.

29,962.—Charles Fleming, of Ypsilanti, Mich., for an Improvement in Molding Planes:

I claim the combination of the guide strip D, with ¼ round and o-gee molding planes, for the purpose set forth.

29,963.—George Freeman, of New York City, for an Improvement in Wood-screws:

I claim the combination with a wood screw of a counter-sinking tool, or cutter, by providing or forming the head of the screw with a cutter or cutters for operation, substantially in the manner described.

29,964.—O. L. Gibson, of Fort Bend County, Texas, for an Improvement in Cotton Seed Planters:

I claim the seed-box with its movable and changeable parts in connection with the balance of the machine, when the same is so constructed and arranged as to plant seed in the manner described.

29,965.—Edmund Greenlee, of Summerhill Township, Pa., for an Improved Stave-jointer:

I claim, first, The combination of the planes, B B′, stocks, C′, united by the links, C, guide-rods, K, guides, D, and bow-strings, R, when arranged together for joint operation, substantially in the manner and for the purpose described.

Second, The combination of the adjustable frame, F, with the guides, D, which carry the reciprocating planes, when arranged relatively to the bed upon which the stave rests while being jointed, as described.

Third, The combination of the reversible follower, M, with the spring Z, and dogs, x x′, when arranged and operated as described, for the purpose set forth.

29,966.—C. P. Gronberg, of Aurora, Ill., for an Improvement in Raking Attachments for Harvesters:

I claim the bent rake shaft, E, fitted in the vibrating frame, D, in connection with the projection, q, and chains, m p, attached respectively to the lever, j, and arm, o; all being arranged for joint operation as and for the purpose set forth.

[This invention relates to an improvement in that class of self-raking devices for harvesters in which the rake moves in the arc of a horizontal circle over the platform, and has a rising and falling movement—a falling one at the rear of the platform, so as to work in close proximity to the latter while moving towards its front end in order to rake the cut grain therefrom, and a rising one at the bent part of the platform, so that the rake may pass above or over the grain on the platform to the back end thereof.]

29,967.—J. R. Hall, of Brunswick, Maine, for an Improved Machine for Sawing Out Shingles:

I claim, first, The arrangement of the loaded lever, L, connected with shaft, J, the shafts, C H E, the loaded arm, N, rod, M, provided with catch, K, lever, O, and the pendant, p, and projection, q, on the bolt carriage, as and for the purpose set forth.

Second, The rods, Z A′, fitted in the carriage, B, provided with the cam projection, b′ c′, in connection with the uprights, d′, attached to the frame, A, and the bent levers, V Y, palls, U X, and ratchets, T W, provided with the alternate long and short teeth, all being arranged to operate substantially as and for the purpose set forth.

Third, The application of the spring, e, and the cam shaft, B′, to the frame, S, of the bolt carriage, as shown and described, for the purpose of facilitating the adjustment of the bolt in the carriage, and the retaining of the same within the carriage, as set forth.

[This invention relates to certain improvements in a machine for sawing shingles, for which Letters Patent were granted to the same inventor, bearing date June 22, 1858. The invention consists in an improvement in the mechanism employed for feeding the bolt carriage to the saw and gigging back the same, and also in an improvement in the means employed for adjusting the bolt relatively with the saw for the purpose of giving the desired taper to the shingles. The object of the invention is to simplify and render the machine more efficient than hitherto, and without the liability of getting out of repair.]

29,968.—S. Z. Hall, of Sequin Texas, for an Improvement in Feeders for Cotton Gins.

I claim the combination of the feed apron, D, delivering roller, C, swinging frame, M, with its attached gearing and rocking lever, I, with its actuating gearing, substantially as and for the purposes set forth.

29,969.—A. E. Harding, of Middletown, Ohio, for an Improved Marine Propeller:

I claim the frame, B, vertical supports, c, dead-wood extension, B, and horizontal guiding bars, l, in combination with the reciprocating folding propellers, C C, the whole being constructed and arranged in the manner and for the purposes substantially as set forth.

29,970.—J. R. Harrington, of New York City, for an Improvement in Machines for Making Carpet Lining:

In combination with the spindles, b b′, on which the outer sheets or rolls of paper, or other material employed are wound, I claim the feed table, I, endless apron, k, and rollers, L L′ L, when the same shall be arranged and operated as described, and for the purpose specified.

29,971.—Isaac Hayden, of Lawrence, Mass., for an Improvement in Cotton Cleaners:

I claim a trunk for cleaning cotton and other substances, dividing it horizontally or centrally with a screen of woven wire or twine, with cells or compartments under said screen, so small as to prevent or break the current of air under said screen, substantially as described, in combination with a machine substantially such as is described in this specification, or its equivalent, for opening the cotton and blowing it through said trunk over the screen, substantially as described.

29,972.—A. Hoagland, of Jersey City, N. J., for an Improved Wash-board:

I claim the pivoting of a vibrating frame, A, at x, when such vibration is controlled by the springs, B, and the frame, A, is enclosed within a common hand washboard, all in the manner and for the purpose set forth.

29,973.—Ansel Holman and O. A. Kelly, of Slaterville, R. I., for an Improved Machine for Hardening Scythes:

We claim the combination of clamps of suitable size and form to hold the blade to be tempered, with ribs arranged upon the faces of the clamps next the blade to be hardened, in directions crosswise to each other, substantially as set forth.

We also claim the combination of a set of clamps curved in a direction the reverse of that in which the blade warps in hardening, with mechanism for closing the clamps upon the blade and immersing them in the hardening liquid, substantially as set forth.

We also claim the combination of clamps for holding the blade with mechanism that immerses them rapidly in the hardening liquid and then moves them slowly therein, substantially as set forth.

We also claim the combination of clamps for holding the blade during immersion with mechanism that moves the clamps laterally in the hardening liquid, substantially as set forth.

We also claim the combination of clamps for holding the blade during immersion with mechanism that reverses and opens the clamps, so that the blade is delivered automatically from the clamps, substantially as set forth.

We also claim mounting a receiving table in such manner, with reference to the clamps, the mechanism for operating the same and the vat of hardening liquid, that the hardened blade is received upon the said table after hardening is effected.

We also claim the combination of a shaft to which an intermittent rotary motion is to be imparted with a continuously revolving shaft, by means of ratchet wheel having teeth of different size and a reciprocating pall, substantially as set forth.

We also claim the combination of the next preceding combination with a second pall, substantially as set forth,

29,974.—F. A. Hull, of Belvidere, Ill., for an Improvement in Grates for Steam Boilers:

I claim the arrangement of the crank levers, D E, in combination with the hinged sections, B C, of a grate, constructed and operating as and for the purpose set forth.

[This invention consists in arranging a grate with two or more sections, which are hinged at one end and supported by separate crank levers or links in such a manner that each of the sections can be raised or dropped independently of the other section or sections, and that the fireman is enabled to clean one section after the other without putting out the fire.]

29,975.—C. F. Johnson, C. F. Johnson, Jr., and W. W. Johnson, of Owego, N. Y., for an Improved Lock:

We claim the traveling carriage, f, arranged, substantially as specified, to move forward with the bolt and leave it projected, or move forward and connect to said bolt and draw the same back, as set forth, in combination with tumblers, o, moving with said carriage and acting between the tumblers, m and p, as specified.

29,976.—W. W. Justis, of Genito, Va., for an Improvement in Machines for Straightening and Pressing Tobacco:

I claim the clamping bars, D D′, sash frame, E, treadle, F, perpendicular guide rollers, H H, and guides or tongues, N N, with the movable drums, J′, and yielding drums, J, the whole being combined, arranged and operating in the manner and for the purposes set forth.

[This invention is an improved machine for straightening and pressing the leaves of tobacco into solid cakes or bars. It consists in pressing the bundles of leaves between adjustable parallel clamps, vertical guide rollers and guides, and horizontal yielding rollers.]

29,977.—Daniel Lasher, of Brooklyn, N. Y., for an Improvement in Grate Bars:

I claim forming grate bars with the alternately connected parallelograms, b b, in combination with the bar, a, beneath, and connecting the same as and for the purposes specified.

29,978.—B. F. Lee, of New York City, for an Improvement in Railroads:

I claim studding the track of a line of railroad, or exposed portions of it, with upper projecting spikes, or their equivalents, substantially as and for the purpose set forth.

29,979.—P. A. Letourneur, of New Orleans, La., for an Improved Cement:

I claim a cement which I call indestructible cement, composed of the above substances, prepared as aforesaid, which will make the roofs and other places covered with it both fire and waterproof.

29,980.—C. A. Littlefield (assignor to himself and David Bovle), of Covington, Ky., for an Improvement in Fire-places:

I claim the arrangement of the bonnet, B, hollow crown, E, partition, e, tube, H, flues, B B′, apertures, K F G, and doors, f and k, constructed, combined and operating in the manner and for the purposes set forth.

29,981.—Julius Loeb, of New York City, for an Improvement in Thread-dressing Machines:

I claim the diagonally grooved flanges or ribs, e e, on the revolving brush, to separate, loosen and spread the threads composing the skeins, so that the brushes, b, may act equally on all sides of said threads to glaze the same, as set forth.

29,982.—Ira Mason, of Berlin, N. H., for an Improvement in Saw Teeth:

I claim, first, Shaping saw teeth, substantially as described, so that the edges, 2 2, operate with a drawing cut and leave the boundary of the kerf square with the sides thereof.

Second, The peculiar set given to the teeth, herein shown and described.

Third, Giving to the teeth of a saw, in combination, the form and set as above claimed.

29,983.—George Marlow, of Cincinnati, Ohio, for an Improvement in Apparatuses for Heating Buildings:

I claim the arrangement of the fire-pot, A, ash-pit, B, sloping topped heater, C, and escape pipe g, with the radiator, D, air flues, E E, and cold air casing, F, as and for the purpose shown and described.

[This invention consists in arranging a heater surrounded by a radiator and by an outside casing, in such a manner that the bottom of the heater, as well as its top and sides, are free to come in contact with the surrounding air, which is introduced through a passage between the outside casing and the radiator, and which, after having been heated by coming in contact with the surface of the heater, passes up into the building through suitable flues.]

29,984.—Arthur Maginnis, of Philadelphia, Pa., for an Improved Method of Ventilating Hats:

I claim providing the hat with a recess at the junction of the brim with the body, and filling said recess with a perforated india-rubber tube, the tube being covered by a perforated sweat leather, substantially as and for the purpose fully specified.

29,985.—Bernhard Mertz, of Burlington, Iowa, for an Improvement in Harvesting Machines:

I claim hinging the front end of the tongue, N′, to the back of the machine by means of a joint, O′, in combination with the universal joint, K′ L′ M′, toothed arc, Q′, and pall, P′, substantially as and for the purposes set forth.

29,986.—S. H. Miller, of Hanoverton, Ohio, for an Improvement in Governors for Steam Engines:

I claim, first, The balancing bar, I, and springs, J J, in combination with a governor, substantially as and for the purposes set forth.

Second, The arranging of a sliding top collar, B, linked arms, C D, and rods, E, and governor balls, F, in combination with a balancing bar, I, and springs, J, substantially as and for the purposes set forth.

29,987.—C. D. Ober and S. M. Ober, of Morrisville, Vt., for an Improved Washing Machine:

We claim the arrangement of rubber, R, constructed as described, with the corrugated board, C, yielding roller, G, dogs, r, standards, E E, shafts, D and I, arms, m n and e, and rods, p and f, as and for the purposes set forth.

29,988.—J. J. Parker, of Marietta, Ohio, for an Improved Apple Parer, Corer and Slicer:

I claim, first, The combination with paring knife, S, of the movable guide, K, in the manner and for the purposes specified,

Second, The combination with the knife, S, of the trough, T, as and for the purpose specified.

Third, The slicing knife, N, arranged and operating as described.

29,989.—Henry Pease, of Brockport, N. Y., for an Improvement in Pumps:

I claim the combination of the cylinder, E, wings, b b, supports, d d, beveled pistons, F, graduated grooves, n o, and governing passage, T, the whole being constructed, arranged and operated in the manner and for the purpose set forth.

29,990.—Charles Perley, of New York City, for an Improved Vertical Ships' Windlass:

I claim, first, The arrangement of the brake sockets, m n, pawls, 1 2, and wheels, d f g and l, substantially as specified, whereby the shaft, a, can be rotated by the double brakes in either direction, as set forth.

Second, I claim the sleeve, t, and heaver, q, arranged in the manner and for the purposes specified.

Third, I claim the heavers, q and r, fitted on a vertical shaft, and arranged substantially as specified, so that either or both heavers can be connected to or disconnected from said shaft, and thereby allow for raising or giving out either or both chain cables, or using the said shaft for a capstan independent of the chain heavers, as set forth.

Fourth, I claim the vertical guard, s, and flange, 5, constructed and arranged as specified, to separate and guide the respective chains and keep them in place, as set forth.

29,991.—Augustus Pruyn, of Albany, N. Y., for an Improvement in Wood Saws:

I claim the arrangement of the short end piece, B, long end piece, C, straining bar, D, and rod, F, substantially as shown, to form a frame for the saw, A, and an improved article of manufacture, for the purposes specified.

[The object of this invention is to simplify and render the saws of the class above-named far stiffer than usual, so that the frames will be light and still firm, prevented from racking, and the saw readily strained and kept in a properly strained state.

29,992.—Wm. Rankin, of Providence, Va., for an Improved Machine for Planing Moldings:

I claim the combination of the skewed feed rolls and adjustable guides for guiding or directing the stick in a straight or curved line as it passes the cutters, substantially as described.

29,993.—Joseph Raub, of Highland, Pa., for an Improved Hoop Sawing Machine:

I claim, first, The conical feed rollers actuated by levers, G G G′ G′, and rods, b b, in combination with the pressure rollers, N N′ arranged, combined and operating substantially in the manner set forth.

Second, The levers, D D, connecting rods, R R′, levers, E1 E2, connecting rod, K, with the pressure roller rods, L L, in combination, as and for the purpose set forth.

Third, The gage roller, e′ e′, in combination with the saws, e, for the purpose of keeping the sawed work an even thickness throughout, as set forth.

[This invention consists in hanging in a vertical reciprocating saw frame two swinging saw gates, carrying, each, a narrow saw and two rollers, one on each side of the saw, and operating said saws by means of certain levers and cords so as to swing them both round from one side to the other, whereby two hoops may be sawed from a pole at one time, the poles passing from either side of the machine. It further consists, in connection with the swinging saws, in arranging on each side of the elliptical, or other suitable shaped frame which serves as a table, a pair of fluted conical feed rollers that are operated by levers and pawls with the up and down motion of the saw frame, and over each pair is arranged a feed pressure roller whereby the feed rollers will be accommodated to the varying sizes of one pole or any number of poles, and the feed motion will be kept up uniformly in sawing poles of a large or small diameter. It also consists in a novel arrangement of knee levers and slotted connecting rods with hand levers for alternately applying and relieving the pressure rollers.]

© 1860 SCIENTIFIC AMERICAN, INC.

29,994.—A. A. Raymond, of Salem, Mass., for an Improvement in Treadle Connection for Machinery:

I claim the combination with the treadle and crank pin of the rod, E, rocking bar or lever, D, spring, G, and rod, F, the whole applied and operating substantially as and for the purpose set forth.

[This invention is more especially intended to be applied to sewing machines, but is applicable, with the same advantage, to other machines worked by treadles. It consists in a novel combination of a spring, a rocking bar, a lever and two connecting rods for transmitting motion from a treadle to its crank, whereby the crank is caused to be helped past its centers when in motion, thus rendering the operation of treading less laborious and is prevented stopping on the centers, thus obviating all difficulty in starting it.]

29,995.—Wm. Rice, of Philadelphia, Pa., for an Improvement in Bombshells:

I claim charging a shell with a series of partially severed metallic rings or strips, arranged substantially as and for the purpose set forth.

29,996.—Wm. Robinson, of Augusta, Ga., for an Improved Machine for Jointing Staves:

I claim the combination of the bed, B, with the carriage, A, and cutter shafts, I I, the whole constructed, arranged and operating substantially as and for the purposes set forth.

I also claim, in combination with the foregoing, the pressure roller, c', arranged and operating as and for the purpose specified.

29,997.—Wm. Robinson, of Augusta, Ga., for an Improved Machine for Riving and Dressing Staves:

I claim the laterally adjustable dogging carriage, in combination with the reciprocating bed, B, carrying the riving knife, E, and the arrangement of these parts with the dressing mechanism, substantially as set forth.

29,998.—B. F. Roe, of Nebraska City, Nebraska, for an Improvement in Fanning Mills:

I claim the combination and arrangement of a toothed scouring cylinder, H, a toothed concave, a c, and a smooth concave, b, with apertures, i and x, between the two concaves, substantially as and for the purposes set forth.

29,999.—B. T. Roney, of Philadelphia, Pa., for an Improvement in Harvester Cutters:

I claim the upper knives, C, so connected to the cutter beam that they can tilt laterally to a limited extent, and having the rods, J and J', or their equivalents, arranged in respect to the cutting edges of the said upper knives, as set forth, in combination with the lower reciprocating knives, I, for the purpose specified.

I also claim the peculiar arrangement of the vibrating upper knives, C, and their rods, J and J', in respect to the cutter-bar, G, and guard finger, B, whereby an open space is afforded for allowing the vibrating rods to discharge the clogged grain or grass from the cutters, as set forth.

30,000.—Wm. H. Seymour and Lothrop Seymour, of Weymouth, Ohio, for an Improvement in Cultivators:

We claim the special arrangement of the swinging or adjustable frames, Q, in combination with the hinged arms, M N, and adjustable teeth, when constructed and operating as described.

30,001.—Wm. Shafer, of Ripon, Wis., for an Improved Washing Machine:

I claim the combination of spur rods, C C, concave washboard, B, buttons, c c, and vibrating rubber, composed of rollers, g g, arranged and operating conjointly as and for the purposes set forth.

[This invention consists in combining, with a curved and yielding washboard arranged within the wash-box or tub, which is of a quadrangular shape, a vibrating or pendulum rubber with a rolling surface, which is made to set upon the surface of the washboard or upon the clothes placed thereon with a rolling and squeezing pressure, instead of a rubbing pressure. The washboard is made adjustable, so that the machine may be adapted to wash large or small articles with great ease and facility; at the same time, the washboard will preserve its yielding action.]

30,002.—H. W. Shipley, of Mount Vernon, Ohio, for an Improvement in Smut Machines:

I claim the concave cone-like cylinder, A A, the corresponding shaped case, C C, and beaters, B Z, in combination, and operating as described.

30,003.—Charles Smith, of Knoxville, Texas, for an Improvement in Cotton Cleaners:

I claim, first, The employment of a conical shaft, C, provided with spiral fans, d d, at one of its ends, and with teeth, e, set in spiral lines round its circumference and along the remainder of its length, in combination with a cylinder, B, surrounding the same, constructed partly of wire-work and partly of sheet metal, and an exterior case, A, which is constructed with an air-supply passage, G, and a cotton-discharge passage, J y Z, substantially as and for the purposes set forth.

Second, The combination of the passage, H, in the circumference and near the discharge end of the interior wire gauze cylinder, with the slotted hinged valve, f, substantially as and for the purposes set forth.

30,004,—A. P. Spaulding and Elisha Pierce, of Westminster, Mass., for an Improvement in Machines for Bending Wood:

We claim the combiuation and arrangement of the vises, U U, or their equivalents, with the bearing strip, T, of the mechanism for holding and bending the wood, as specified.

30,005.—Stephen Stewart, of Philadelphia, Pa., for an Improvement in Closing Doors and Gates:

I claim the combination and arrangement of the lever, C, with the cord, E, pulleys, G G, and carrier, F, or their equivalents, and the door, B, substantially as and for the purpose set forth.

30,006.—Thomas Stewart, of Pittsburgh, Pa., for an Improvement in Safety Guards for Railroads:

I claim the arrangement of the central roller, G, rail, B, pendants, h, and hooks, i, with the wheels, E, rails, A, pendants, H H, springs, l l, rods, I, bars, F F, rollers, o o f', lever, J, and rod, K; all as shown and described.

[This invention has for its object—first, the preventing of the throwing of the cars from the track by obstructions or other causes, as well as the sustaining of the cars in case of the breaking of a wheel or axle; second, in a novel and improved brake for expeditiously "braking up" the cars by a moderate application of power.]

30,007.—J. C. Stoddard, of Worcester, Mass., for an Improvement in Horse Rakes:

I claim operating the rake so as to raise or hold it in a depressed state, by means of the friction wheel hung in movable bearings and between the rim or flange of the driving wheel, and a friction roller, essentially as set forth.

[This invention consists in a peculiar manner of hanging the rake, in combination with a sliding piece in which one end of the rake-head has its bearing, and to which piece is pivoted two cams or segments, suitably connected together and operated by a treadle or foot-pieces, so as to bring each segment alternately in contact with the projecting rim of one of the wheels, which operation either raises or depresses the rake teeth when the machine is in motion, according to the respective cams or segments brought in contact with the wheels' rim.]

30,008.—L. F. Straight, of Fairbury, Ill., for an Improvement in Corn Planters:

I claim, first, The combination and arrangement of levers, I I' and K' K'', constructed and operating in the manner and for the purposes set forth.

Second, The combination of the removable valve, E, forked lever, F, and slides, H H', arranged and operating substantially as and for the purposes set forth.

Third, The combination of the internal adjustable slide, h, with the vertical hollow barbed seeding slide, H, or H', constructed, arranged and operating, in connection with the conducting tube, D, in the manner and for the purposes set forth.

30,009.—J. W. Strange, of Bangor, Maine, for an Improvement in Spring Dividers:

I claim the combination and arrangement of the sliding yoke, Y, and the screw, S, when applied to calipers and dividers, substantially as and for the purposes set forth.

30,010.—Daniel Strock, of Chambersburg, Pa., for an Improvement in Horse Rakes:

I claim the combination of the rake-head and straining frame, when arranged and operating substantially as described, for the purpose set forth.

30,011.—A. C. Tibbetts, of Rockland, Maine, for an Improvement in Fore-and-aft Sails for Vessels:

I claim the described application or arrangement of the carriage, C, and swinging boom, B, together with the bowsprit, A; the whole being to operate in the manner and for the purpose substantially as specified.

30,012.—Dwight Tracy, of Worcester, Mass., for an Improvement in Sewing Machines:

I claim, first, The combination, with the perforating eye-pointed needle of a sewing machine, of the thread-clamping device, constructed and operating substantially as described, and the independent thread-drawing device, constructed and operating substantially as shown and described.

Second, The employment, within the shuttle of a sewing machine, of a take-off apparatus, operating to take off from the bobbin a quantity of thread to be held in reserve between the bobbin and the point where the thread leaves the shuttle till it is required to be delivered from the shuttle, and then to let out the quantity necessary to form a stitch without drawing from the bobbin, substantially in the manner described.

Third, The combination, in the shuttle of a sewing machine, of the take-off apparatus described, with the clamping piece, constructed as described, and operating to hold the thread at the time of the tightening of the stitch, as specified.

Fourth, The employment, in combination with a needle and shuttle of an elastic pointed fork, constructed and applied and operating to extend and spread the loops of the shuttle thread, which are drawn through the cloth, substantially as set forth.

30,013.—J. G. Treadwell, of Albany, N. Y., for an Improvement in Ranges and Stoves:

I claim the arrangement of the fire box, the draft flue, a, and the hoppers, F F, with the ovens, D and E, and with the hot-air flues around and between the hoppers, substantially as and for the purpose specified.

30,014.—L. B. Tyng, of Lowell, Mass., for an Improvement in Railroad Joints:

I claim the method described of constructing rail joints for railroads; that is to say, I claim the bar, I, connected to side splices, A, in combination with rails, F, and plates, a b c, substantially as described and for the purposes fully set forth.

30,015.—A. Little, Ove Wall, George Roberts and M. S. Cartter, of Decatur, Ill., for an Improvement in Portable Capstans for Mole Plows:

We claim, first, The combination of the spools, G H, and shaft, F, with the system of cords, d1 d2 d5, levers, D, and pulleys, d3, when the whole are arranged together for joint operation, substantially in the manner described, for the purpose set forth.

Second, The construction of the front axle, C, with a swiveling bearing, c, in combination with the semi-circle, c2, and turning latch, c3, when arranged together for joint operation, substantially as and for the purposes set forth.

Third, Supporting the wheels in adjustable arms, b, when said arms are arranged and operate, in relation to the bent axles, substantially as and for the purpose described.

30,016.—Jonathan Walton, of Brooklyn, N. Y.. for an Improved Door Latch:

I claim the combination and arrangement of the slot, A, the inclined plane, B, and the ball, C, substantially as and for the purpose described.

30,017.—S. M. Wirts, of Hudson, Mich., for an Improvement in Grain Separators:

I claim the arrangement of the spring, D, and bottom, E, with the hopper, C, and shoe, B, as and for the purpose shown and described.

[This invention consists in the employment of a self-adjusting movable yielding bottom for the hopper, said bottom being attached to the shoe, and arranged to insure an even distribution of the seed over the screens. It also consists in a peculiar means employed for preventing the choking or clogging of the supplemental screens, and, at the same time, obtain an efficient shake motion and concussion to insure its perfect operation. It further consists in a novel means employed for transmitting the shake motion to the shoe and supplemental screens from the fan-shaft, whereby a very simple and direct application of the power is obtained, and a smooth, steady motion given the shoe.]

30,018.—W. A. Wood, of Hossick Falls, N. Y., for an Improvement in Raking Apparatuses for Harvesters:

I claim, in combination with an automatic rake, a traveling belt for carrying the front and a turning guide for directing the shank of the rake, when the belt moves with the rake horizontally over the platform, substantially as described.

30,019.—G. W. N. Yost, of Yellow Springs, Ohio, for an Improved Link for Chains:

I claim the combination and arrangement of the open link, A, and swivel, B, constructed and operating substantially as described and for the purposes set forth.

30,020.—Amos Chase (assignor to N. C. Page), of North Weare, N. H., for an Improved School Desk:

I claim the arrangement of the desk, A, and sliding bar, C, with the bar, E, bolt, F, and sockets, B D, as and for the purpose shown and described.

[The object of this invention is to obtain an adjustable school desk which may be conveniently raised and lowered to suit the size or hight of the children. The fixed school desks and seats in present use are a fruitful source of many physiological evils, in consequence of not being adjustable to suit the size or hight of different children. The invention consists in a peculiar arrangement of slide for the desk, whereby it may be adjusted to the desired hight and retained firmly in proper position.

30,021.—Henry Burrows, of Georgetown, D. C., assignor to himself and E. W. Woodruff, of Washington, D. C., for an Improvement in Fences:

I claim adjusting the wires around the posts of a portable folding fence, in the manner described, so that the requisite degree of tension is produced by prolonging the sections, and the wires are held firmly in their places, as shown and set forth, for the purposes specified.

30,022.—L. B. Batcheller (assignor to himself and R. B. Hurd), of Rochester, N. Y., for an Improved Chair Seat:

I claim constructing chair seats from wire cloth, arranged substantially in the manner and for the purposes set forth.

30,023.—L. M. Gilmore (assignor to himself and J. M. May), of Janesville, Wis., for an Improvement in Rock-drilling Machines:

I claim, first, Constructing and combining members, G H and I, of a drill, and rings, d d, or their equivalent, when arranged substantially as described and for the purposes set forth.

Second, The devices, consisting of plates, e e, or their equivalent, in combination with members, G H and I, and rings, d d, when used for adjusting the diameter of a drill, substantially as described.

Third, The use of the elastic strap, E, and cams, B B, when arranged for operating a drill and for analogous purposes, substantially as described.

30,024.—C. B. Hutchinson (assignor to R. A. Hutchinson), of Auburn, N. Y., for an Improved Barrel-head Machine:

I claim, first, The cast iron frame, A, supporting all the working parts, and constructed substantially as and for the purposes specified.

Second, I claim the swing crane or pier, C, the lever, w, the locking bar, F, the center points, N N, the form of the cutters, O O, and their mode of attachment in the cutter-head, h, in combination with the projections, M M, and their indentations, K, substantially as described, and for the uses and purposes set forth.

30,025.—Z. McDaniel (assignor to himself and J. W. Jewell), of Bowling Green, Ky., for an Improvement in Hanging Millstones:

I claim providing the balance iron, A, with a recess, a, larger in diameter than the upper part of the spindle, and having a plate, b, which rests on the spindle, fitted in the recess, as and for the purpose set forth.

30,026.—James Molyneux (assignor to the Bordentown Machine Company), of Bordentown, N. J., for an Improvement in Blocks for Forming Tiles:

I claim constructing the block for forming tiles and other clay forms in two halves, A and B, and combining therewith the bar, C, or any other equivalent device, by which the block may be expanded or contracted, for the purpose specified.

30,027.—H. B. Nash, of Sandy Hill, N. Y., assignor to A. B. King, of Troy, N. Y., for an Improved Miter Box:

I claim the arrangement of the sliding oscillating adjustable arms, g g, and parts, f f, with the sliding pivoted arms, D D', and adjustable guide gates, K K, as and for the purpose shown and described.

[The object of this invention is to construct a miter box which can be adjusted to different saw blades, and which enables the operator to cut boards of any thickness perfectly correct to any desired angle.]

30,028.—G. W. Pittock, of Union Mills, N. Y., assignor to Isaac Brown, of same place, and Joseph Bowman, of Troy, N. Y., for an Imorovement in Griddles:

I claim the combination of the arms or cross pieces, A, with the inner ring, R R, and the tube or ring, B, as and for the purposes shown and described.

30,029.—A. T. Underhill, of New York City, assignor to C. R. Underhill, of New Castle, N. Y., for an Improvement in Evening the Edges of Shirting:

I claim the method of evening shirting herein shown and described.

[This invention is an improved method of evening shirting for facilitating the work of the cutter and for effecting an economy in the cutting of shirts, collars, &c., where they are cut in large numbers, and where several thicknesses of material are cut through at one operation.]

30,030.—Wallace Wells (assignor to himself and S. B. Wells), of New York City, for an Improvement in Steam Engines:

I claim the combination of the pistons with the connecting rods and crank arms, or their equivalents, arranged substantially as described.

30,031.—T. S. Washburn (assignor to E. B. Booth), of Rochester, N. Y., for an Improvement in Sewing Machines:

I claim the combination of the spur, m, on the cam, F, with the abrupt notch or recess, r, in the looper, H, when so arranged as both to allow the looper to more speedily enter the loop of the needle thread, and to prevent any reverse motion of the parts at the most critical moment in forming the stitch, substantially as specified.

RE-ISSUES.

Hiram Berdan, of New York City, for an Improvement in Bakers' Ovens. Patented Oct. 20, 1857:

I claim, first, The method of setting and drawing bread, &c., substantially as set forth, namely, by means of cars or detached platforms made to move in and out of the oven automatically in the manner described.

Second, I also claim the method of baking bread, &c., substantially as described, that is to say, by the employment, in combination with an oven, of cars or detached platforms so arranged and supported that while in the oven they shall be conveyed in vertical tiers through the same, and shall be made to move horizontally into and out of the said oven.

Third, I also claim the method, as set forth, of applying the heat to the bread, that is to say, by having the cars or detached platforms placed in such vertical sieves, while in the oven, that the bottom of each car shall serve as a protector or screen from a too great heat to the bread, &c., upon the car which is immediately beneath, substantially as described.

Fourth, I also claim transferring each car as it arrives successively at the end of its series, to a tier or series which is moving in an opposite direction, whereby said cars may readily be operated automatically, both while in the oven and while entering and emerging from the same.

G. W. Brown, of Galesburg, Ill., for an Improvement in Seed Planters. Patented Aug. 2, 1853. Antedated Feb. 2, 1853. Re-issued Feb. 16, 1858:

I claim a seed planting machine constructed principally of frame work, the front part of which is supported on not less than two runners or shoes, with upward inclining edges, and the rear part supported on not less than two wheels, the latter being arranged to follow the former, substantially as and for the purpose set forth.

© 1860 SCIENTIFIC AMERICAN, INC.

G. W. Brown, of Galesburg, Ill., for an Improvement in Seed Planters. Patented Aug. 2, 1853. Antedated Feb. 2, 1853. Re-issued Feb. 16, 1858:

I claim the construction of a shoe or runner for seed planting machines, with an upward inclining edge, and its point sufficiently high or raised as that it will climb up and over, or cut or break through any intervening obstacles without materially forcing the earth laterally at its front part, and widening towards its rear end, so as to open out a gash or furrow in which the seed to be planted may be deposited, and long enough to furnish a support to the frame work substantially as described.

G. W. Brown, of Galesburs, Ill., for an Improvement in Seed Planters. Patented Aug. 2, 1353. Antedated Feb. 2, 1853. Re-issued Feb. 16, 1858:

I claim, in combination with a seed planting machine, constructed principally of frame work, with not less than two runners and not less than two wheels, a hinged joint betwee the point of the tongue and the rear part of the machine, so that one part of the framework may be raised, lowered, adjusted or supported on the other part, substantially as described.

G. W. Brown, of Galesburg, Ill., for an Improvement in Seed Planters. Patented Aug. 3, 1852. Antedated Feb. 2, 1853. Re-issued Feb. 16, 1858:

I claim a seed planting machine wherein the seed dropping mechanism is operated by hand or by an attendant, in contradistinction from mechanical dropping, the mounting of said attendant upon the machine in such position that he may readily see the previously made mark supon the ground, and operate the dropping mechanism to conform thereto, substantially as set forth.

I also claim, in combination with a seed planting machine composed substantially of framework, and upon which the person who works the seed slides or valves sits or stands, a lever or its equivalent by which a dr ver or second attendant may raise or lower that part of the framework that carries the attendant and the seeding devices, and thus ease the machine in passing over intervening obstacles or in turning around, substantially as described.

G. W. Brown, of Galesburg, Ill., for an Improvement in Seed Planters. Patented Aug. 2, 1853. Antedated Feb. 2, 1853. Re-issued Feb. 16, 1858:

I claim, first, In combination with a seed planting machine carried mainly by or supported mainly upon not less than two runners and two covering wheels, a pair of auxiliary wheels and an axle for the double purpose of taking a portion of the weight off from said runners and covering wheels, and for affording the means of converting the machine from a hand planter to an automatic seed sower, substantially as set forth.

Second, I also claim hanging the axle of the auxiliary wheels in hinged and adjustable arms or levers so that more or less of the weight of the machine may be placed upon said auxiliary wheels, substantially as described.

Henry Cowing, of Corpus Christi, Texas, for an Improvement in Gang Plows. Patented Nov. 26, 1850:

I claim, first, The combination of the driving shaft, d, and pinions, e, the countershaft, f', and pinions, f, the short shafts, g, and the pinions, i, with the internally geared spur wheels, h, when arranged for operating with plows substantially as and for the purpose set forth.

Second, Raising and lowering the plows substantially in the manner described by an apparatus operated by the power of the engine when the said apparatus is under the control of the engineer.

Third, A projecting frame at the rear of the engine, when the same is arranged to overhang the plows and is sufficiently elevated to permit them to be raised above the axle of the supporting wheels, or the lowest portion of the frame, whereby the engine is enabled to pass over obstructions with facility.

Fourth, The combination in a steam plow of a hoisting apparatus operated by the power of the engine with an overhanging frame, substantially as described for the purposes set forth.

Fifth, The steering apparatus arranged and operating as described, in combination with the frame gearing and plows herein described, for the purpose set forth.

Sixth, The combination of the steering wheel, c, driving wheels, b, overhanging frame, r, and gangs of plows, I, I I, I I I, when arranged and operating substantially as described, for the purpose of cultivating between the rows of standing crops.

Seventh, The combination of the straining frame, n, and adjusting screws, n3, with the hinged side pieces, m2, of the plow frame, substantially as described for the purpose set forth.

Eighth, The rattoon or stubble cutter, C (Fig. 5), applied substantially in the manner set forth, in combination with a gang of plows.

Ninth, The plate, Y, applied at the lower part of subsoil plows, substantially as explained, for the purpose of elevating the subsoil previous to turning.

J. C. Stoddard, of Worcester, Mass., for an Improvement in Hay Making Machines. Patented Dec. 6, 1859:

I claim, first, The rake head shaft furnished with friction wheels or rollers, which are arranged on pivoted lever bearings in combination with driving wheels, which are furnished with a plain flange for the friction rollers to act against, so that the necessary friction may be produced either by means of the specified lever arrangement, or by the same in combination with the gravity of the rake head, substantially as and for the purpose set forth.

Second, I further claim arranging or setting the bars, N, in the heads, D D, in such a manner that the teeth may be adjusted and given any desired angle by the mechanism and essentially in the manner described.

[This re-issued claim relates to the adjustment of the spreading bars either separately or together.]

EXTENSION.

Elias Howe, Jr., of Brooklyn, N. Y. (formerly of Cambridge, Mass.), for an Improvement in Sewing Machines. Patented Sept. 10, 1846:

I claim, first, The forming of the seam by carrying a thread through the cloth by means of a curved needle on the end of a vibrating arm, and the passing of a shuttle furnished with its bobbin in the manner set forth, between the needle and the thread which it carries, under a combination and arrangement of parts substantially the same with that described.

Second, I claim the lifting of the thread that passes through the needle eye by means of the lifting rod, W, for the purpose of forming a loop of loose thread that is to be subsequently drawn in by the passage of the shuttle, as fully described, said lifting rod being furnished with a lifting pin, u, and governed in its motions by the guide pieces and other devices, arranged and operating substantially as described.

Third, I claim the holding of the thread that is given out by the shuttle, so as to prevent its unwinding from the shuttle bobbin after the shuttle has passed through the loop, said thread being held by means of the lever or clipping piece, g', as herein made known, or in any other manner that is substantially the same in its operation and result.

Fourth, I claim the manner of arranging and combining the small lever, m' n', with the sliding box, M, in combination with the spring piece, Z, for the purpose of tightening the stitch as the needle is retracted, as described.

Fifth, I claim the holding of the cloth to be sewn by the use of a baster plate furnished with points for that purpose, and with holes enabling it to operate as a rack in the manner set forth, thereby carrying the cloth forward and dispensing altogether with the necessity of basting the parts together.

USEFUL HINT TO OUR READERS.

BOUND VOLUMES.—Persons desiring the first volume of the New Series of the SCIENTIFIC AMERICAN can be supplied at the office of publication, and by all the periodical dealers; price, $1.50; by mail, $2, which includes postage. The volume, in sheets, complete, can be furnished by mail; price $1. Vol. II. is now bound and ready for delivery. The price for this volume is the same as that charged for Vol. I.

Notes and Queries

CORRESPONDENTS sending communications for publication in our columns are requested to avoid writing on both sides of a sheet of paper. This fault, though common to persons unaccustomed to writing for the press, gives great trouble to the printer (especially in long articles), and, when combined with illegibility of handwriting, often causes interesting contributions to be regretfully consigned to our waste-paper basket.

A. G., of Maine.—Mr. H. has succeeded well with his English and French patents, so we understand. You can procure a valid patent in those countries for any substantial improvement which you may have made. We will attend to the business for you, as we have well established agencies in all European countries. Our business in this department is very large and constantly increasing. We will mail you a circular which contains a synopsis of the foreign laws.

B. S., of Va.—We advise you to send us a sketch and description of your alleged improvement in tobacco-cutting machines, and we will make a careful preliminary examination into its novelty. This will be conducted at the Patent Office, and if there is anything in the way of your success, we shall be most likely to discover it. This examination will cost but $5, and will generally inform you of your prospects. We charge no fee for an opinion without this examination at the Patent Office.

T. W. C., of La.—Through the lower strata of the atmosphere, the temperature diminishes at the rate of one degree for every 352 fect of perpendicular ascent.

E. B., of Pa.—If a society should be formed for experimenting with flying machines, your suggestion to measure the power required to raise a given weight by means of wings or fans will doubtless be adopted.

J. B. K., of Ill.—It seems to us that the patent laws in combination with the free institutions of the country are the best means for supplying farmers and others with good implements, at fair prices.

S. J., of N. Y.—The Fair of the American Institute will be held at Palace Gardens, corner of Fourteenth-street and Sixth-avenue, on the 25th inst. It is devoted wholly, this year, to horticulture.

T. P., Jr., of Ga. and Y. S., of Somerville.—A little energy will enable you to find a man who will carry out your invention, if it will do what you say it will. Try the sharpest and hardest money maker in your neighborhood. The expansion question we shall soon open fully to discussion.

J. S. C., of S. C.—We do not discover the slightest novelty in your proposed plan for constructing balloons. If you have access to Vol. I, (old series) of the SCIENTIFIC AMERICAN, you will find the same old cigar-shaped balloon such as you now propose. The only objection to it is that it cannot be made to work. If you can get over this obstacle, your theories will be realized.

G. W., of Pa.—The red balls of sumac are gathered in August. Sicily sumac is now quoted at $70 to $80 per tun.

E. J. W., of Iowa.—The force of gunpowder varies much with the quality. In some experiments the pressure was found to be 25,000 pounds to the square inch. It has been so strongly confined as to be burnt without explosion. A solid beam will support more weight than a hollow one of the same size.

S. F. F., of Mich.—We know of no prepared glue which is as strong as the ordinary kind applied when hot.

L. M. C., of Ind.—There are several modes of silver plating. Plated ware is made by first plating the metal, and then fashioning it into vessels, in which case the silver is soldered to the baser metal in a furnace. On smooth aricles, like door knobs, the silver is soldered by passing a hot iron over it, which melts the solder by transmitting the heat through the silver plate. All sorts of articles are also plated by the galvanic process.

R. B. W., of Ill. The liquor employed by goldsmiths to color their trinkets is made by dissolving 1 part of sea salt, 1 part of alum, and 2 parts of niter in 3 or 4 parts of water. J. E. Stevenson's turbine—manufactured at the Novelty Iron Works (this city)—is the one which yielded the best results at the experiments in Philadelphia.

H. D., of N. Y.—You will find an explanation of nearsightedness in almost any of the school books on Natural Philosophy. We know of no cure; you must be content with spectacles.

J. P. H., of Va.—The "cold solder" (copper amalgam) is worth a trial for the purpose you name. When two metals in contact are put into strong salt or acid solutions, the whole becomes a galvanic battery, and the more positive metal dissolves. Solder for metallic vessels which contain corrosive liquids should be as nearly as possible like the mass of metal.

R. P., of Texas.—We have seen pieces of wrought and cast iron soldered by the Franklinite pig metal. It makes a close and strong joint. The flat seam, for tin roofs, is most common here.

A. F. O., of Ky.—If you boil, in a glass or porcelain vessel, a quart of your water, which you suspect contains lead, down to four ounces, and then add a drop of sulphide of ammonium, and the water retains its clearness, you need have no fear. If lead be present, the water will become turbid, and, in a short time, a black powder will settle to the bottom, from the amount of which you may determine how much lead was originally in the water.

G. T. P., of Wis.—Your failure to make gold stick to leather appears to be a fault of manipulation, which you will overcome by thought and practice. When the sizing is in the proper state of stickiness and the tool used is of the proper temperature, you should have no difficulty. We know of no work which treats specially of the coloring of leather. Dyestuffs will color leather about the same as cloth.

J. C., of N. Y.—We are doubtful about the novelty of your improvement, and advise a preliminary examination to be made at the Patent Office. This we can do, by receiving from you a fee of $5. There are a great many inventions in this class, as you are doubtless aware.

C. C., of Pa.—You will find that green goggles will protect your eyes while looking into the muffle of a dental furnace. It is generally understood that green glasses are the best to screen the eyes from dazzling light.

J. W. T., of Ohio.—Cyanide of potassium is poisonous, chiefly by virtue of hydrocyanic or prussic acid which is spontaneously generated from it; and as this acid is volatile and penetrates to all parts of the system, immediately, there can be no such certain antidote for it as oxyd of iron is for arsenic. Sulphate of iron would be an antidote, provided the supposition you make is true, but it is not.

P. L., of N. Y.—Your arrangement for navigating the air seems to be quite ingenious, but it contains but very little novelty. Similar arrangements have been shown to us before.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Sept. 15, 1860:—

J. S., of Pa., $30; S. M. G., of Vt., $30; R. S., of N. J., $30; W. H. R., of Fla., $55; S. T. H., of Mich., $25; P. H., of Mass., $60; B. R. H., of Cal., $25; J. H. F., of Cal., $75; T. B. J., of Ill., $32; G. S. A., of Pa., $30; J. H. C., of N. Y., $25; H. S. W., of R. I., $30; A. A., of N. Y., $20; E. D. M., of N. J., $12; J. H. H., of Ky., $25; S. W., of Fla., $35; C. C., of Mich., $30; J. B. C., of Ohio, $20; J. B. S., of Conn., $30; J. A., of Conn., $25; S. & S., of Pa., $35; J. H. G., of N. H., $25; E. B. C., of Fla., $25; E. W. F., of La., $5; J. T. H., of Miss., $25; G. N. C., of Conn., $25; G. & S., of Ohio, $30; H. B., of N. Y., $30; N. S., of Ill., $25, N. S. M., of Conn., $45; J. C., of Minn., $30; W. E. F., of Mo., $25; W. J. & Co., of Ohio, $30; H. B. J., of N. J., $30; J. P. A., of Ga., $30; J. W. C., of Ind., $30; L. & V., of N. Y., $107; A. G. A., of N. Y., $250, J. B. P., of Miss., $55; L. A. B., of N. Y., $30; T. J. F., of Ill., $30; H. S., of Ohio, $25; O. P., of N. Y., $110; J. C., of N. Y., $140; S. & M., of N. Y., $30; T. J. S., of Ga., $30; D. B. B., of Pa., $30; C. H., of La., $30; J. C. C., of N. Y., $100,

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 15, 1860:—

N. S. M., of Conn.; N. S., of Ill.; W. E. F., of Mass.; J. W. H., of N. C.; S. L. B., of S. C.; D. E. T., of N. Y.; D. & W. W. B., of Iowa; J. T. E., of N. Y.; J. C., of N. Y.; H. S., of Ohio; J. A., of Conn.; F. & J., of N. Y.; J. T. H., of Miss.; G. N. C., of Conn.; W. C., of Iowa; E. B. C., of Fla.; J. H. G., of N. H.; C. H., of La.; S. S., of Pa.; E. M. F., of La.; A. E. T., of La.; G. S., Jr., of Maine; W. H. R., of Fla.; H. & S., of Mich.; E. D. M., of N. J.; J. H. H., of Ky.; S. W., of Fla.; J. E. A., of Ill.; R. S., of N. J.; A. H., of N. Y.; J. C., of Iowa; A. J. G., of Mass.; S. W., of Vt. (3 cases); J. H. F., of Cal.; J. H. C., of N. Y.; J. E. S., of Maine.

IMPORTANT TO INVENTORS.

THE GREAT AMERICAN AND FOREIGN PATENT AGENCY.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, are happy to announce the engagement of HON. CHARLES MASON, formerly Commissioner of Patents, as associate counsel with them in the prosecution of their extensive patent business. This connection renders their facilities still more ample than they have ever previously been for procuring Letters Patent, and attending to the various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c., &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of fifteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

A pamphlet of information concerning the proper course to be pursued in obtaining patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. They also furnish a Circular of Information about Foreign Patents.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Messrs. MUNN & Co.:—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

Communications and remittances should be addressed to

MUNN & CO.,

Publishers, No. 37 Park-row, New York.

© 1860 SCIENTIFIC AMERICAN, INC.

RATES OF ADVERTISING.

THIRTY CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

$1.200 A YEAR MADE BY ANY ONE with $10 Patent Stencil Tools; stock enough included to retail for $150. With activity, this amount may be realized in two weeks' time. The only reliable source for these tools is at Fullam's American Stencil Tool Works, the largest and only permanent manufactory in the world, located at Springfield, Vt. Salesrooms--No. 212 Broadway, New York; No. 13 Merchants' Exchange, Boston, Mass.; and Springfield, Vt. A beautiful photograph of the American Stencil Tool Works and surrounding scenery on Black river sent on receipt of 25 cents. These works command the exclusive and entire control of the whole river at all seasons, and the machinery for manufacturing Stencil Tools is driven by a water wheel of 75-horse power, affording immense and unlimited advantages which no other concern can pretend to claim. The $10 outfit is for cutting small name-plates and business cards. Tools for cutting large work of all sizes furnished for $25. No experience is necessary in using any of these tools. Do not fail to send for samples and circular; and if you buy Stencil Tools, be sure to get Fullam's, as they are universally known to be the only perfect-cutting tools made. Address or apply to A. J. FULLAM, Springfield, Vt.; No. 13 Merchants' Exchange, Boston, Mass.; or No. 212 Broadway, New York. 13 8c

FOR SALE—THE PATENT RIGHT FOR States and counties, or for the whole United States, of a Roller Drill sowing all kinds of grain, patented the 5th of June, 1860. Any number of rollers can be placed upon one shaft; by a single screw, half of the rollers can be moved at once, regulating the quantity per acre and giving out a continuous stream. The right to be sold at a bargain. JAMES GREEN, Patentee,
1* Kennett Square, Chester county, Pa.

$1.00 COPYING PRESS—WITH BOOK FOR copying business-letters instantly and perfectly, is sent, post-paid, by the manufacturer for $1.27. The subscriber will send two for $1.27, provided one shall be exhibited for premium at a fair this Fall. Address, with stamp,
J. H. ATWATER, Manufacturer.
1* Providence, R. I.

FOR $100—HALF INTEREST IN A PATENTable Graduating Dumb-bell; cast hollow, and filled with shot.
1* A. B., P. O. box No. 41, Brookline, Mass.

ANALYTICAL CHEMISTRY.—ESSAYS AND analyses of Ores, Manures, Soils, Plants; Commercial Essays, &c.; Conversations and Advices on Chemistry, applied to arts and manufactures. Address Professor H. DUSSAUCE, New Lebanon, N. Y. 1*

THE COPYRIGHT AND FIXTURES FOR A valuable article for sale cheap. Address immediately.
12 2* SPENCE & CO., No. 86 Court-street, Boston, Mass.

FULTON'S COMPOUND—WARRANTED TO remove Scale from steam boilers, without injury.
11 4* ASHCROFT & CO., No. 50 John-street, New York.

STEAM BOILER EXPLOSIONS.—ASHCROFT'S Low Water Indicator. No. 50 John-street, New York. 11 4*

BACK NUMBERS AND BOUND VOLUMES OF the NEW SERIES of the SCIENTIFIC AMERICAN can always be had of A. WINCH, No. 320 Chestnut-street, Philadelphia, Pa. 11 12*

STEAM GAGES.—ASHCROFT & CO., NO. 50 John-street, New York. 11 4*

GALVANIZED IRON PIPE—CHEAPER AND better than lead for water. Is used in the cities of Brooklyn and Hartford for water pipes in dwelling houses. Sold at wholesale by JAMES O. MORSE & CO., No. 76 John-street, New York. 10tf

FOR SALE—TWO LARGE TRIP HAMMERS; one new and one second-hand (as good as new). For full description see advertisement in SCIENTIFIC AMERICAN.
3 12* J. C. HOADLEY, Lawrence, Mass.

FOR SALE—A STATIONARY STEAM ENGINE, 7x15, 10-horse power, with boiler and all appurtenances; has been in use three months; in perfect order. An excellent engine. Particulars on application. J. C. HOADLEY, Lawrence, Mass.
3 13*

FOR SALE—A DOUBLE HORIZONTAL STEAM engine, 16x36, 100-horse power; has been in use one year; in perfect order. Three boilers and all appurtenances. Particulars on application. [3 13*] J. C. HOADLEY, Lawrence, Mass.

BARREL HEAD-CUTTERS, PLANERS AND wheel-jointers for sale at the Greenwood Patent Barrel Machine Works, Rochester, N. Y. [7 8*] JNO. GREENWOOD.

SCRUBBING BRUSHES, FLESH BRUSHES, Hand Brushes, Nail Brushes, &c.—For a good valuable article, see illustration on page 400, last volume of the SCIENTIFIC AMERICAN.
2 3

5,000 AGENTS WANTED--TO SELL FIVE new inventions—one very recent, and of great value to families. All pay great profits to agents. Send four stamps and get 80 pages particulars. EPHRAIM BROWN, Lowell, Mass.
10 4*

BURNHAM'S IMPROVED JOUVAL TURBINE water wheel (patented Feb. 22, 1859) and mill gearing of the latest improved patterns. Manufactured by N. F. BURNHAM, Variety Iron-works, York, Pa. 1 13*

PORTABLE STEAM ENGINES—6, 8 AND 10-horse, at $500, $625 and $780. For sale by S. C. HILLS, No. 12 Platt-street, New York. 1 e3w

NEW SHINGLE MACHINE—THAT WILL RIVE and Shave 24,000 Shingles in a day, for sale by
1 tf S. C. HILLS, No. 12 Platt-street, New York.

WOODWORTH PLANING MACHINES FROM $80 to $150.—Sash-molding, tenoning and mortising machines at low prices. For sale at the Philadelphia Machinery Depot, No. 135 North Third-street. [1 13*] CHAS. H. SMITH.

GREAT CURIOSITY.—PARTICULARS SENT free. Agents wanted. SHAW & CLARK,
6 24* Biddeford, Maine.

WEST TROY BELL FOUNDRY (ESTABLISHED in 1826).—The subscribers manufacture, and have constantly for sale at their old-established foundry, their superior Bells for churches, academies, factories, steamboats, locomotives, plantations, &c., mounted in the most approved and substantial manner, with their new patented Yoke and other improved mountings, and warranted in every particular. For information in regard to keys, dimensions, mountings, warrantee, &c., send for a circular. Address A. MENEELY'S SONS, West Troy, N. Y. 8 6

FOX'S "EXCELSIOR" CRACKER MACHINE—Patented Feb. 1, 1859, can be seen in full operation at his extensive bakery at Lansingburg, N. Y., doing the work of 90 men, with only 10 operatives employed in this large establishment. The machine has also been patented in England, France and Belgium, Territorial rights are offered for sale. For further particulars, please address Ira Jagger, at Albany, N. Y., who is agent for the sale of machines and territorial rights. [25 13] JOSEPH FOX.

TO MANUFACTURERS OF CHEMICAL PRODucts.—Processes, information and drawings on every kind of Chemical Fabrications. Address Professor H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1*

$15.000 OR $20,000 WANTED—TO INcrease the capital of a first-class foundry and machine business of fifteen years' standing. To a practical man with the above amount of means, this offers an excellent opportunity of engaging in a well established and paying business None but those with the requisite qualifications need apply. References exchanged. Address, with real name, Box 1,217, St. Louis, Mo. 12 2*

T. F. TAFT'S IMPROVED SHEARS—FOR sheet metal of all sizes, bars flat or round. May be seen at No. 12 Platt-street and No. 96 Maiden-lane, New York. Also manufacturers of punches, windmills, pumps, &c.
12 2* T, F. TAFT & CO., Worcester, Mass.

HARRISON'S GRIST MILLS—20, 30, 36 AND 48 inches diameter, at $100, $200, $300 and $400, with all the modern improvements. Also, Portable and Stationary Steam-engines of all sizes, suitable for said Mills. Also, Bolters, Elevators, Belting, &c. Apply to S. C. HILLS, No. 12 Platt-street, New York. 1 e3w

LABORATORY OF CHEMISTRY.—ADVICES and experiments on Chemical Fabrications, with drawings, such as Matches, colors of Zinc and Lead, Distillation, Candles, Soaps, Oils, Gas, Coal Oils, Paper, Animal Black, Manures, Limes, Pottery, Glass, Varnishes, Inks, Gilding, Calico-printing, Dyeing, Bleaching, Perfumery, Sugar and Cakes. Address Professor H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1*

IMPORTANT TO MECHANICS.—THE VARIETY MOLDING MACHINE.—This machine is a combination of six patents, and superior to all others for shaping, planing and molding irregular forms; also straight molding and planing. It is simple and safe to the operator. See illustration on page 329, Vol. I., of the SCIENTIFIC AMERICAN. Send for circular. Address S. M. HAMILTON, Baltimore, Md. 1 13*

READY THIS DAY.—NEW EDITION, REvised and Enlarged.—"Wells' Every Man his Own Lawyer and United States Form Book." A complete and reliable guide to all matters of business negotiations for every State in the Union, containing simple instructions to enable all classes to transact their business in a legal way without legal assistance. Also, containing the laws of the various States and Territories concerning the Collection of Debts, Property Exempt from Execution, Lien Laws, Laws of Limitation, Laws of Contract, Legal Rates of Interest, License to Sell Goods, Qualifications of Voters, &c., &c. ☞ No man or business woman should be without this work; it will save many times its cost, much perplexity and loss of time. 12mo., 408 pages, law binding; price $1. Sent postpaid. Agents wanted for this and other popular publications. Address JOHN G. WELLS, Publisher, corner of Park-row and Beekman-streets, New York. 25 tf

TO OIL AND COAL OIL MANUFACTURERS. Processes, with drawings, to manufacture and purify every kind of Oils and Coal Oils. Address Professor H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1*

THIS DAY PUBLISHED.—"STEAM FOR THE MILLION;" a popular treatise on Steam and its Application to the useful arts, especially to Navigation. Intended as an instructor for young seamen, mechanics, apprentices, academic students, passengers in mail steamers, &c. By J. H. WARD, Commander U. S. Navy. A new and revised edition; 1 volume octavo; cloth, $1. Sent free by mail, on receipt of price.
1* D. VAN NOSTRAND, No. 192 Broadway, New York.

BROWN & GARRISON'S AGENCY FOR THE sale of Patent Rights and all labor-saving articles, at No. 126 Randolph-street (Post-office box No. 1,219), Chicago, Ill. 13 2*

PORTABLE STEAM ENGINES, COMBINING the maximum of efficiency, durability and economy with the minimum of weight and price. They received the large gold medal of the American Institute, at the late fair, as "the best Portable Steam Engine." Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 1 22*

PUMPS! PUMPS!! PUMPS!!!—CARY'S IMproved Rotary Force Pump, unrivaled for pumping hot or cold liquids. Manufactured and sold by CARY & BRAINERD, Brockport, N. Y. Also, sold by J. C. CARY, No. 2 Astor House, New York City. 23 13

WROUGHT IRON PIPE, FROM ONE-EIGHTH of an inch to eight inches bore, with every variety of fittings and fixtures, for gas, steam or water. Sold at the lowest market prices by JAMES O. MORSE & CO. No. 76 John-street, New York. 10tf

Zur Beachtung für Erfinder.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

THE GRAEFENBERG THEORY AND PRACTICE OF MEDICINE.—On the 1st day of May, 1860, the Graefenberg Company's Sales-rooms, Consulting Offices and Medical Institute were removed from No. 84 Park-row to—
No. 2 Bond-street, New York,
(first door from Broadway,) in order to afford greater facilities and a more central location, demanded by the rapid increase of confidence in the Graefenberg Theory and Practice. The Graefenberg Theory and Practice, and the use of their medicines, together with complete symptoms of all diseases incident to this country and climate, the best method for their prevention and cure, will be found in the "Graefenberg Manual of Health."

This valuable family medical work, containing 300 pages, has been revised and improved, and elegantly illustrated with beautifully colored engravings of the human system. Sent by mail to any part of the country, on receipt of 25 cents. It is a complete guide to all diseases and their cure. Address

JOSHUA F. BRIDGE, M. D.,
Resident and Consulting Physician Graefenberg Co.,
No. 2 Bond-street, New York.

One of the leading journals says of the Graefenberg Manual of Health:—"This is the only medical book for family and general use ever published. It is written in plain language, free from scientific terms, and condenses more practical medical information than can be obtained anywhere else, unless a regular medical course of education is undergone. The popularity of this admirable and compendious work is well shown by this being the twenty-fourth edition. It contains a number of colored anatomical plates, and is a complete family physician. It is at once simple, popular, plain and explicit; and the mother, with such an adviser, is prepared at once to apply the proper remedies in case of sudden sickness in the family. In the country, a copy of the 'Manual of Health' is indispensable, and every family should possess one. It will save a hundred times its cost in doctors' bills, and, what is far better, will be the means of preserving many valuable lives to their families and relatives."
leowtf

OIL! OIL! OIL!—FOR RAILROADS, STEAMers, and for Machinery and Burning. Pease's Improved Machinery and Burning Oil will save fifty per cent., and will not gum. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The SCIENTIFIC AMERICAN, after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE,
No. 61 Main-street, Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the United States and Europe. 1 13

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The Hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise at our warehouse. NEW YORK BELTING AND PACKING COMPANY. JOHN H. CHEEVER, Treasurer,
1 13 Nos. 37 and 38 Park-row, New York.

J. FAY & CO., WORCESTER, MASS., MAKE an improved Surfacer; the clipper with wrought iron head and steel bearings. Fitt's patent Knife-adjuster and Feed-works; Sash and Door Machinery, as usual. Send for circulars. 8 2*

WOODWORTH PLANERS—IRON FRAMES TO plane 18 to 24 inches wide, at $90 to $110. For sale by S. C. HILLS, No. 12 Platt-street, New York. 1 tf

GUILD & GARRISON'S STEAM PUMPS FOR all kinds of independent Steam Pumping, for sale at 55 and 57 First-street, Williamsburgh, L. I., and 74 Beekman-street, New York.
1 13 GUILD, GARRISON & CO.

IRON PLANERS, ENGINE LATHES, AND OTHER Machinists' Tools, of superior quality, on hand and finishing, and for sale low; also Harrison's Grain Mills. For descriptive circular, address New Haven Manufacturing Co., New Haven, Conn. 1 13

SOLID EMERY VULCANITE.—WE ARE NOW manufacturing wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used, and will do a much greater amount of work in the same time, and more efficiently. All interested can see them in operation at our warehouse, or circulars describing them will be furnished by mail.
NEW YORK BELTING AND PACKING CO.,
1 13 Nos. 37 and 38 Park-row, New York.

C. L. GODDARD, AGENT, NO. 3 BOWLING Green, New York. Only Manufacturer of the Steel Ring and Solid Packing Burring Machines and Feed Rolls for Wool Cards, &c.
1 20*

BURNELL'S PATENT ROTARY PUMP—adapted to all purposes of pumping, from the well and cistern to the steam fire-engine. The most simple, durable and efficient pump yet made. Principal sales depot at No. 23 Platt-street, New York. [1 13*] SAMUEL B. LEACH.

PORTER'S CENTRIFUGAL GOVERNOR.—THE attention of parties troubled with irregular or unsteady power is respectfully called to this Governor, now coming into general use. It may be used in connection with any valve or cut-off, and will regulate the motion of the engine so perfectly that its entire load may be thrown on or off at once, without sensibly affecting its speed. I will send a Governor to any responsible person for trial; and if its action is not perfect under the above test, it may be returned. Prices exceedingly moderate. All orders and communications will receive prompt attention. Send for a circular.

Address CHAS. T. PORTER, 235 West Thirteenth-street, corner of Ninth-avenue, New York. A few reliable agents wanted.
1 tf.

STOVER MACHINE COMPANY, NO. 13 PLATTstreet, New York—Manufacturers of Stover's Patent Eagle Molding Machine, for cutting and planing irregular forms of every description—illustrated in No. 25, Vol. I., SCIENTIFIC AMERICAN—and of the Stover & Coffin Patent Combination Planing Machine—illustrated in No. 19, Vol. II., SCIENTIFIC AMERICAN. Also, all kinds of Wood and Iron labor-saving machinery, Railroad Supplies, &c. &c.
1*

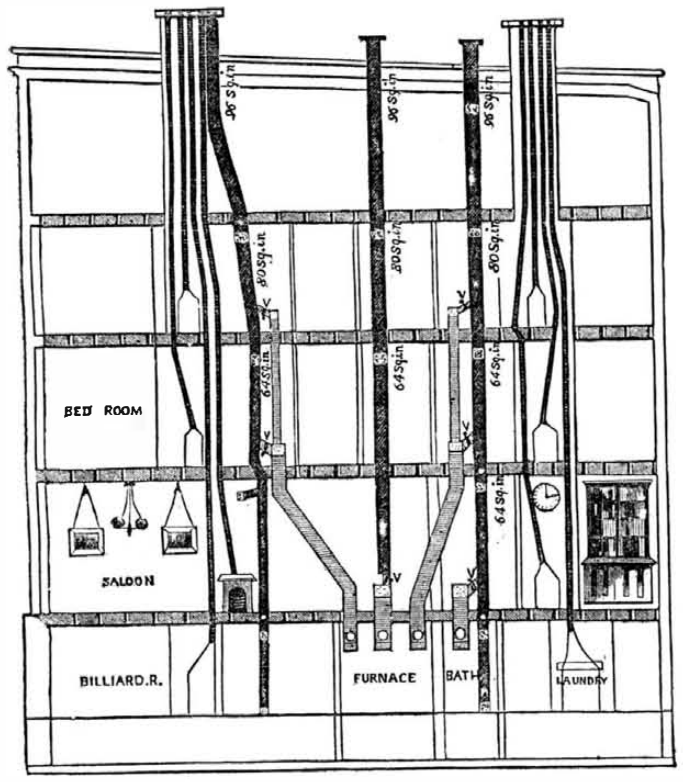
GRAY & WOODS' PATENT IMPROVED Planer; a combination of the Woodworth and Daniels' planers, particularly adapted for shop work, and for which we have obtained three patents and six medals. (See description and illustration in No. 6, Volume II., SCIENTIFIC AMERICAN.) Also, for sale, all kinds of wood-working machinery. Send for a circular. Address GRAY & WOODS, No. 69 Sudbury-street, Boston, Mass. 1 tf

A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise et qui preferent nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence.
MUNN & CO., Scientific American Office, No. 37 Park-row, New York.

© 1860 SCIENTIFIC AMERICAN, INC.

DR. GRISCOM'S IMPROVED METHOD OF VENTILATION.

This plan for ventilating houses, suggested and put in execution by Dr. J. H. Griscom, of New York, received the sanction of the Third National Quarantine and Sanitary Convention, held in this city. It pertains to the chemical method, the motive power of the air being heat, but requiring no extra expenditure of fuel, the heat used for the purpose being only the waste heat of the furnace by which the house is warmed. The arrangement consists in the construction of independent ventilating flues in the walls of the house, in proximity to the hot air tubes, so that the two may be connected together by means of a lateral or branch tube, by which a current of hot air may, at any desired moment, be transmitted from the hot-air tube to the ventilating flue. By this means, the ventilating flues, which terminate in the open air like an ordinary chimney, will be warmed by the hot air from the furnace, when the ordinary hot-air register is closed, as at night in a dwelling, or in a school-house after school hours.



If properly constructed of brick or smooth stone, the walls of the flue will, after a current of hot air has passed through it a short time, become sufficiently heated to rarefy the air within, thus giving the flue a good ventilating power, even after the current of hot air has been withdrawn. For example, if the hot-air register of a parlor be closed at ten o'clock at night, and the heat, instead of being thrown back into the furnace, is allowed to pass through the lateral tube into the ventilating flue, and so continue till six the next morning, it is evident that, during those eight hours, the interior of the ventilating flue must become thoroughly heated, so that the next day, when the current of hot air is restored to the parlor, the heated sides of the ventilating flue will continue to rarefy the air within them for many hours, and perhaps even days afterwards.

There being no danger of a reaction of the air of the flue through the ventilating register (as is the case when ventilating openings are made in ordinary fire-flues), connections with the apartment to be ventilated may be made at any point, and even carried to the opposite side of the house, between the beams of the ceiling, to ventilate distant apartments. Dr. Griscom's method has the advantage of being applicable to all edifices warmed by hot-air furnaces of any description, which, in general, are those most needing ventilation. This arrangement may be introduced into many houses already erected, by connecting the hot-air tubes with such of the ordinary chimney-flues as are not used with fire.

One of the principal advantages appertaining to this plan is the capability of having a large number of ventilating flues put in connection with the furnace. In fact, the number may correspond with the number of hot-air registers, and thus any desirable amount and extent of ventilation be obtained.

The cut represents an elevation of the west wall of the residence of E. V. Haughwout, Esq., Gramercy Park, Twenty-first street, New York, showing the position and connections of the warming and ventilating flues. The letter V indicates the valves in the connecting tubes; the figures indicate the areas of the ventilating flues in square inches.

PRODUCTION OF VALUABLE MANURE FROM THE AIR.

Plants are composed principally of four elements, oxygen, hydrogen, nitrogen and carbon, and it has been satisfactorily ascertained that the most of the hydrogen and nitrogen enter the plant in the form of ammonia, which consists of one atom of nitrogen combined with three atoms of hydrogen (NH^3). The value of guano and most other concentrated manures consists of a considerable extent, of the ammonia which they contain. As three quarters of the atmospheric air consists of nitrogen, and as hydrogen forms one ninth of all pure water, if some cheap means could be found for inducing the hydrogen of water to enter into combination with the nitrogen of the air in the form of ammonia, this valuable manure could be produced in unlimited quantities, and the agricultural products of the world enormously increased. The efforts to do this have been, at last, crowned with success, as will be seen by the following article which we translate from the Paris *L'Invention*. It will be remembered that cyanogen is composed of carbon and nitrogen; it is the bicarburet of nitrogen (C^2N).

"Since the remarkable labors of Messrs. Liebig, Schaltenmann and Kuhlmann, on the fertilizing action of ammoniacal salts, the production of ammonia at a low price has become a problem of the highest interest to agriculture. But to arrive at this result it is necessary to obtain the nitrogen elsewhere than in the nitrogeneous matters; which may, for the most part, be employed directly as manures, and of which the limited quantities and elevated price permits in any event only restricted and costly manufacture.

"Atmospheric air is an inexhaustible and gratuitous source of nitrogen. However, this element presents so great an indifference in its chemical reactions, that, notwithstanding the numerous attempts which have been made, chemists have not heretofore succeeded in combining it with hydrogen, so as to produce ammonia artificially. This result, so long desired, has been reserved for MM. Margueritte and de Sourdeval, who have obtained it by employing an agent of which the remarkable properties and, neat and precise reactions have permitted them to succeed where all others had failed. This agent is baryta, of which we have often spoken on the occasion of the recent applications that Mr. Kuhlmann has made of it in painting, but of which no person suspected the role that it was to be called to play in the development of the agricultural riches of our country. The manufacture of ammonia is based on a fact entirely new, the cyanuration of baryum. It had been believed until the present time that potash and soda alone had the property of determining the formation of cyanogen; that the earthy alkaline bases—baryta, for example—could not, in any case, form cyanurets.

"Messrs. Margueritte and de Sourdeval have ascertained that this opinion is entirely erroneous, and that baryta, much better than potash or soda, fixes the nitrogen of the air or of animal matters in considerable proportions. It is already understood that, for the preparation of Prussian blue, the cyanuret of baryum presents great advantages over that of potash, for the equivalent of baryta costs only about the one seventh of that of potash. Thus do we find practically and really obtained the result first announced by Desfosses and vainly pursued in France and England, the manufacture of the cyanurets with the nitrogen of the atmospheric air. This solution, so important, depends on the essential difference which exists between the properties of baryta and those of potash; the first is infusible, fixed, porous, becomes deeply cyanuretted without loss; the second is fusible, volatile, becomes cyanuretted only at the surface, and suffers by volatilization a loss which amounts to fifty per cent. After the cyanuret of baryum was obtained, the grand problem for Messrs. Margueritte and de Sourdeval to resolve, was the transformation of the cyanuret into ammonia by means at the same time simple, rapid, and inexpensive. The following is the operation:—

"In an earthern retort is calcined, at an elevated and sustained temperature, a mixture of carbonate of baryta, iron filings in the proportion of about 30 for 100, the refuse of coal tar, and sawdust. This produces a reduction to the state of anhydrous baryta, of the greater part of the carbonate employed. Afterwards, across the porous mass, is slowly passed a current of air, the oxygen of which is converted into carbonic oxyd by its passage over a column of incandescent charcoal, while its nitrogen, in presence of the charcoal and of the baryum, transforms itself into cyanogen and produces considerable quantities of cyanuret. In effect, the matter sheltered from the air and cooled, and washed with boiling water, gives with the salts of iron an abundant precipitate of Prussian blue. The mixture thus calcined and cyanuretted is received into a cylinder of either cast or wrought iron, which serves both as an extinguisher and as an apparatus for the transformation of the cyanuret. Through this cylinder, at a temperature less than 300° (Centigrade), is passed a current of steam which disengages, under the form of ammonia, all the nitrogen contained in the cyanuret of baryum."

Cosmos, from which *L'Invention* extracts the above article, properly remarks that it is impossible to foresee all the results of this great discovery. Among other things, it suggests the production of nitric acid from the air by oxydizing ammonia.

INVENTORS, MACHINISTS, MILLWRIGHTS, AND MANUFACTURERS.

The SCIENTIFIC AMERICAN has been published FIFTEEN YEARS, and is the Repertory of Inventions and Discoveries collected from all parts of the world. It is indispensable to the Inventor and Patentee; each number containing a complete official list of the claims of all the patents issued each week at the United States Patent Office, besides elaborate notices of the most important inventions, many of which are accompanied with engravings executed in the highest degree of perfection, as each number of the paper testifies.

To the Mechanic and Manufacturer the SCIENTIFIC AMERICAN is important, as articles in every number treat of matters pertaining to their business.

The SCIENTIFIC AMERICAN is published weekly, in a form suitable for binding, each number containing sixteen pages of letter-press, with numerous illustrations, all of which are prepared expressly for this publication, making a yearly volume of 832 pages of useful matter not contained in any other paper.

The SCIENTIFIC AMERICAN is not only the best but cheapest paper devoted to Science, Mechanics and Inventions published in the world, and has a larger weekly circulation than the combined subscription lists of all similar publications in this country and England.

Terms.

To mail subscribers: Two Dollars a Year, or One Dollar for Six Months. One Dollar pays for one complete volume of 416 pages; two volumes comprise one year. The volumes commence on the first of JANUARY and JULY.

Club Rates.

Five Copies, for Six Months.....$4
Ten Copies, for Six Months.....$8
Ten Copies, for Twelve Months.....$15
Fifteen Copies, for Twelve Months.....$22
Twenty Copies, for Twelve Months.....$28

For all clubs of Twenty and over, the yearly subscription is only $1 40. Names can be sent in at different times and from different Post-offices. Specimen copies will be sent gratis to any part of the country.

Southern, Western and Canadian money or Post-office stamps taken at par for subscriptions. Canadian subscribers will please to remit twenty-six cents extra on each year's subscription to pre-pay postage.

MUNN & CO.,
Publishers, No. 37 Park-row, New York.

© 1860 SCIENTIFIC AMERICAN, INC.